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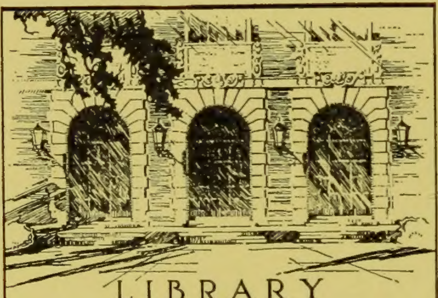
MOURNING DOVE NEWSLETTER



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Federal Aid Branch
U.S. FISH AND WILDLIFE SERVICE
Atlanta, Georgia

MOURNING DOVE NEWSLETTER
(Not for publication)

Issue No. 1 February 1949

This newsletter will be issued periodically to inform those who are interested in the eastern mourning dove research program. Issues will appear about twice a year. We hope that the letter will help to weave the various dove research activities into a cohesive and well-integrated enterprise by keeping the many cooperators informed of the general progress of the work.

BACKGROUND

The dove research program is a cooperative effort on the part of many states to finally bring the management of this species down to a factual basis. It is remarkable how limited our knowledge is concerning a game bird of such wide distribution and hunting popularity. Sporadic studies have been made of the bird, but still the data are insufficient even to determine the proper hunting regulations. Particularly in setting the opening dates of hunting seasons, the Fish & Wildlife Service has been faced with conflicting demands and dissatisfaction from the state game departments. This applies particularly to the Southeast where dove hunting is a major sport.

Such controversies led finally to a resolution of the Southeastern Association of Fish and Game Commissioners that dove management should be brought to a factual basis through coordinated research. The ten state members agreed each to conduct dove studies according to a uniform plan. The Federal Aid Branch of the Fish & Wildlife Service at Atlanta was asked to develop a sample
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Such controversies led finally to a resolution of the Southeastern Association of Fish and Game Commissioners that dove management should be brought to a factual basis through coordinated research. The ten state members agreed each to conduct dove studies according to a uniform plan. The Federal Aid Branch of the Fish & Wildlife Service at Atlanta was asked to develop a sample dove research project. A three-year, standard dove project complete with work plans and field data sheets was written-up. Mimeographed copies were distributed to all states in this region as well as to adjacent regions.

ORGANIZATION

The dove research will be accomplished mostly through Federal Aid projects in the cooperating states. The standard dove project set up work plans and data sheets to accomplish uniformity in the collection of field data and their presentation in reports. Quarterly progress reports and a summary annual report will be submitted each year. A final report at the end of the three-year period will account in full for the data and their interpretation, and it will present the consequent management recommendations.

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Reports from the southeastern projects will be abstracted in Atlanta and an annual, composite report for this region compiled. The Research Branch of the Fish & Wildlife Service will incorporate this report, with data from adjacent regions, in an annual summary for the entire eastern United States. The Research Branch is also compiling a bibliography of dove research, as well as assembling from its files the past records on dove banding. These data will be made available to all cooperators.

The following men are assisting in the overall supervision of the program:
George Moore: Federal Aid Supervisor, U.S. Fish & Wildlife Service, Atlanta, Georgia. Mr. Moore is responsible for the conduct of the Federal Aid research on doves in the Southeast - Region IV.
Leonard Foote: Southeastern Representative of the Wildlife Management Institute. Mr. Foote renders valuable service wherever help is needed, training field personnel, collecting data, and coordinating the work between regions.
Harold Peters: Research Branch, U.S. Fish & Wildlife Service, Charleston, South Carolina. Mr. Peters is compiling abstracts of important papers and the past banding data. He also will summarize the quarterly progress reports. His activities include assistance in the field wherever it is requested, and he is making a specific study of age determination of doves based upon wing characteristics.

CONFERENCES

In the present, formative stage of the program there is needed an intimate exchange of ideas and experience. Work plans, field techniques, and organization requirements should be discussed by the men who are doing the work. An improved approach to the problem will result. An interregional meeting of dove personnel will take place during the North American Wildlife Conference at Washington on March 7 at 3:30 p.m. in the Continental Room of Hotel Statler. At this meeting it is hoped that criticism, particularly of the standard work plans and field data sheets, will result in improvement of these items. The field data sheets especially need strengthening. We urge all dove workers and others interested in the program to attend this meeting.

Following the national conference, it is planned to have a regional meeting of dove personnel in Atlanta. This will affect the ten Southeastern States and it probably will occur about mid-summer.

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NEWS FROM REGION IV

Region IV of the Fish & Wildlife Service comprises the Southeastern States. From North Carolina and Kentucky the Region sweeps south to the Gulf and west through Arkansas and Louisiana. This is the great wintering ground of the eastern mourning dove. The bird is hunted throughout the region, and in the coastal plains of the Deep South it is a popular game species.

Because of the importance of the dove problem in the Southeast, it was hoped that all of the states would start research projects before the opening of their dove hunting seasons last fall. One of the chief questions concerns the opening of hunting before nesting is complete. Therefore, the examination of hunters' bags at the first of the open seasons was especially important to determine the percentage of feeding birds killed.

For various reasons, chiefly lack of qualified personnel, the projects were started late. However, some effort was made in all states to get data from hunters. Leonard Foote of the Wildlife Management Institute, as well as Harold Peters, George Moore, and H.E. Wallace of the Fish & Wildlife Service, hit the field to train state personnel. They taught methods of sexing, separating adults from juveniles, and recognition of breeding birds. The U.S. Game Management Agents in each state assisted in collection of data. State warden forces and Federal Aid personnel played an important role.

Six states now have dove research projects in some form. North Carolina revived a former dove study. Mississippi was the first to submit a standard dove research project. Alabama, Arkansas, Tennessee, and South Carolina followed close behind. Georgia's project is now being approved. Florida and Kentucky are in line but as yet have not found qualified leaders. Data from the states have begun to come into the Regional Office, and the early picture becomes clearer. The keynote is a marked scarcity of doves throughout the South this fall and winter. They find trapping and roadside counts difficult for lack of birds. Some areas had many doves, but these were few and spotty.

Alabama

This State has a three-year, standard dove project. James E. Keeler, a graduate of Kansas State College, is Project Leader. His address is State Department of Conservation, Montgomery, Alabama. Jim Keeler has spent most of his time getting information from dove hunters. Since hunting closed he concentrated on the trapping and banding activities. The initial establishment of trapping stations and getting cooperators to do the work takes much time and it must be done carefully. An abstract of his first report follows.

"Trapping and banding:

15 cooperators have been selected in different parts of the state and they are being supplied with 2 cell Potter traps. An experimental trapping station has been located on the farm of Julius Rice, in Lowndes County. A five-foot square house trap will be tried there for trapping of large numbers of doves.

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Road count:

From October 1 to December 31 a record of doves seen on roads has been kept by the project leader and cooperators. Results are:

	No. miles trav lled	No. doves counted	Average miles per dove
October	4413	689	6.4
November	3138	619	5.66
December	2449	521	4.7

Average number of miles per dove for the three months period is 5.46. The table shows a steady increase in numbers of doves in the state, probably due to the continued mild weather. No mass migration was observed.

Populations:

Questionnaires are sent to all wardens in the state, for information on dove populations and movements, and are returned each week.

Doves are more abundant in the southern third of the state than in the central or northern portions. This is due to abundance of food, principally peanuts, which "holds" doves for longer periods of time.

Kill data:

Since the dove season opened on November 25, 158 doves killed on seven hunts have been inspected. Of this total, 58 were adult males, 42 were adult females, and 58 (about 30%) were juvenile. There has been a large increase in peanut production in the state this year which may account for lessened hunting pressure. Doves move from one field to another instead of circling and returning to the same field where hunters are located.

None of the adults examined were breeding birds. About 90% of the birds were killed between three and four-thirty in the afternoons. Few doves feed earlier than three oclock except on rainy or misty days.

A series of dove wings were collected and sent to the Atlanta office of the Fish and Wildlife Service for study and charting."

Arkansas

David Donaldson is leader of a standard dove research project in this State. He was trained at the University of Arkansas and at Texas A. and M. He lives at Paragould, Arkansas. The project opened formally in October. However, field work started with the opening of the dove season on September 10, and valuable data were obtained during that month.

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Arkansas had one continuous, 45-day season from September 10 to October 24. The season was relatively good with large concentrations of birds in the rice belt of the southeastern part of the State. But, food was so abundant and well distributed and hunters so widely scattered that hunting success was not in proportion to birds present. After the first week or so of the season, hunting pressure declined to a great extent.

During September, in the rice-growing sections, the doves concentrated in fields where rice had been harvested and shocked and in fallow fields grown up to paspalums. Over the remainder of the State the birds were found almost exclusively in large, open fields of croton.

October showed a general exodus of birds over the entire State after the first cold spell about October 20. Thereafter, only small numbers, usually singles and pairs, were seen - as a rule feeding along roadsides. November and December found very few birds in the whole State. The influx of migratory birds was first apparent in mid-December when scattered flocks of 50 or so birds appeared. These probably banded together, since much larger flocks were seen a short while later during the Christmas season.

The following kill data were obtained during the first week of the hunting season:

Total bags checked	39
Total doves checked	312
Hunting success (doves per hunt)	8
Avg. No. Hrs./Hunt	3

This good hunting success seems to contradict the previous statement that hunting success was not in proportion to numbers of birds present. However, so many birds were in the rice fields that, if a sufficient number of hunters had been present, all would have had their limit in an hour.

The following data were obtained from the 312 doves examined:

Juveniles		200	(64% of total bag)
Adults		112	(31% " " ")
Males	84		
Females	28		
Breeders	32		(Breeders represented 29% of adults)

Juvenile birds were classified entirely by diagnosis of primary wing coverts. Birds with adult-plumaged wing coverts were classified as adults even though they may have had a juvenile primary wing feather present. This method of field analysis is open to controversy, but at present is being followed by technicians until a more accurate method is found.

Florida

A dove research project will be started as soon as a qualified leader can be found. In the meantime some interesting data have appeared. Harold Peters conducted a three-week study in South Florida. He found a very high dove population in the three southern counties during October and November. Mr. Peters believes that these birds may have been raised in Cuba and that they may have migrated to Florida during October. They began to disappear in November, but he could not trace their movements. Over 600 birds from hunters' bags were examined, but none of the Cuban sub-species of dove was found in South Florida. About 99% of the birds in hunters' bags were juvenile. Peters estimated that hunters killed about 50,000 doves in the three southernmost counties during October.

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J.V. Kelsey, U.S. Game Management Agent in Florida, has sent in several batches of dove wings for age classification studies. George Moore reported in October that many doves were seen between Tampa and Ft. Myers and between Punta Gorda and Moore Haven. He reported seeing several hundred doves on a plantation north of Tallahassee. Special foods were planted to attract them. They used to kill 2,000 doves each year at this place, but the visiting flocks have steadily diminished during the last decade.

Georgia

Dove research will start as soon as a qualified leader is found. A project has been submitted and is in process of approval. Generally speaking, a considerable decline in numbers of doves was reported this winter.

Kentucky

This State also may open a dove study if a research technician can be obtained. George Moore and H.E. Wallace from the Regional Office visited Kentucky at the opening of the dove season on September 1. They remained a few days and attended several hunts. Some hundreds of birds were examined in hunters' bags. State personnel was trained in dove research techniques.

Louisiana

H.E. Wallace helped State personnel in examination of hunters' bags at the opening of the season. Wallace reported doves so few that hunting was very poor. E.W. Rees, Soil Conservation Service, Ringgold, Louisiana, sent records of ten doves killed. They fed mostly on annual lespedeza.

Mississippi

This State was first in submitting a standard dove project. State Fish and Game Director Freeman has long been interested in the dove problem, and the dove research has his full support. Mr. Freeman selected 25 of his wardens to examine hunters' bags, and they were trained in the proper methods of doing this work. The project is under the leadership of St.Clair Thompson with Sam Boozer as assistant.

From August 1 to September 30 a total of 1,320 doves was examined. Of the adult population, 2% was in breeding condition. For each 100 adult doves there were 147 juvenile birds (juveniles probably low due to possible errors in classifying the young birds).

Mississippi had a split hunting season on doves with the first half covering the period of September 16-October 5 and the second half occurring December 16-January 4. The results of the bag checks made during the first period were as follows:

	Entire 20-day Period	First Ten Days	Last Ten Days
Total Bag Check	312	166	146
Total Doves Checked	1,599	779	820
Hunting Success (Doves per hunt)	5.1	4.5	5.6
Sex ratio (Male:Female)	147:100	---	---
Age ratio (Juvenile:Adult)	155:100	123:100	191:100

Doves were observed in all parts of the State but the large concentrations were seen only within the Yazoo-Mississippi Delta region. These concentrations were usually found in fields where soybeans had been harvested. Soybeans attract the doves in other parts of the State but the larger acreage planted to soybeans in the Delta brings more birds there.

Roadside counts by cooperating wardens gave the following results:

		Number of Doves Seen			
Month	Miles	In Flocks	Singles and Pairs	Total	Doves per mile
October	4,566	3,190	796	3,986	.85
November	3,282	2,241	950	3,191	.97
December	2,040	2,768	743	3,511	1.72

These results indicate an increasing dove population during the latter months of the year. The individual reports also reflect a higher population density in the Delta.

During the period of September 16-October 5 the principal foods of the dove were goatweeds, paspalums, and foxtail grasses. Cultivated grains chiefly used were corn, sorghum, and oats.

North Carolina

All Federal Aid personnel in the State spent the first three days of the open season in the checking of doves killed by hunters. The season opened on September 16, and few birds were seen. Reports were that doves had pretty well left the State by September 1. The dove research under former Federal Aid Project 2-R is being completed and probably will be published in March. We understand that soon thereafter a standard dove project will be undertaken.

South Carolina

Dove research on a part-time basis is under way. It is now limited to hunting kill data and banding activities. Full-scale research may be undertaken later.

To get kill data last fall Mr. A.A. Richardson, Chief of Fish and Game, assigned six wardens to examine hunters' bags. Leonard Foote, Harold Peters, and Herman Zeigler, U.S. Game Management Agent, trained and assisted these men for several days.

Very few doves were reported in South Carolina.

Tennessee

J.T. Hammond, U.S. Game Management Agent, and his son James, checked hunters' bags during the open season. On November 1 a dove research project started with James Hammond as Assistant Project Leader. Data are few as yet, but the following general observations can be made.

Middle Tennessee, especially in the vicinity of Lebanon, is reported to have had about a 30% increase over last year. West Tennessee showed about a 20% increase over last year. Both sections contained a fair number of doves until the end of September. From the first of October until the last of the month the State showed a marked decline. The first known increase was at Paris on October 21st when a new but small concentration of about 100 birds moved into that vicinity. Several other concentrations were reported to have moved into Middle Tennessee the last part of October. Forty to fifty percent of these doves left about the middle of November. November 24th marked the last observed or reported migration into the State. The dove population slowly diminished during December but as of January 1 the State had a better than average bird population.

NEWS FROM OTHER STATES

Our news from states outside of the southeastern region is scant. Leonard Foote has given us some material from the east and northeast, and a dove project report from Missouri brought interesting data from that State. We hope that future issues of this letter will contain more news from other regions.

Delaware and Maryland

Phil Barske of the Wildlife Management Institute writes that doves were scarce in these States. Apparently they have experienced an absence of flocking birds during recent years, and this past season was the worst. Banding programs will be started this spring. Last fall the Maryland Department of Research and Education examined about 200 doves in a bag check.

Missouri

Interesting data came from Federal Aid Project 13-R. Roadside sight counts and cooing counts were made over a 13-mile course in Boone County. Studies covered the period May through October 1948. Observations were made during the first and second hour after sunrise. Both hours show similar results and either is suitable for roadside census.

First young were seen June 8 after which numbers increased rapidly until mid-July. All juveniles left the area by July 22. Remaining doves were singles and pairs, probably breeding adults. September showed a preponderance of adults caring for young. Numbers fluctuated greatly with apparent hatching peaks in early August and September.

The earliest nest was reported in early April. The last fledgling dove was seen on October 22. These are the extremes of the breeding season. Half or more of the young had migrated by September 1 when the dove season opened. Of ten September adults examined, three had pigeon milk or a glandular condition. The conclusion was that 30%-40% of the adults were nesting during the September shooting season. Singles and pairs seen along roadsides during the breeding season seemed to be breeding adults. So, it was recommended that roadside shooting be prohibited, pending further investigation.

Ohio

It is possible that Ohio will undertake a dove study. If so, it may be in cooperation with the Cooperative Wildlife Research Unit.

Pennsylvania

Robert D. McDowell, Research and Planning Division, State Game Commission, stated that all game protectors had been furnished dove questionnaires. These concerned populations, kills, and movements of doves throughout their respective districts. These data will be reported when furnished by the State.

Virginia

Chester Phelps., Chief, State Game Division, reported arrangements with field men to get as much dove information as possible. Each field biologist censused populations and gave ages and sex of doves killed. Selected wardens also assembled kill data.

West Virginia

C.O. Handley, Federal Aid Coordinator, expressed a desire to cooperate in population and breeding studies. Banding activities may be undertaken.

AGE DETERMINATION BY WING CHARACTER

Harold Peters reports on his studies of juvenile and adult feathers of 1,500 dove wings. These were collected from hunters' bags by state wardens, U.S. Game Management Agents, and wildlife technicians in several southern states.

He charted the juvenile and adult feathers in the primary, secondary, primary covert, and greater covert feather tracts. The first juvenile feather to moult to adult is the first (innermost) primary covert. This is quickly followed by the first primary. Each of these two feather tracts moults progressively toward the outer edge of the wing, the primary coverts moulting faster than the primaries. Thus the last juvenile feather to be moulted from the wing is the tenth or outermost primary. The secondaries and greater coverts moult progressively from the first (innermost) toward the inner edge of the wing and are moulted in advance of either the primary coverts or primaries.

Peters claims that it is possible to determine approximate age by counting the number of juvenile primaries remaining in the wing. A dove with all ten primaries still juvenile is a very young bird, probably out of the nest only a few weeks. The bird approaches adult plumage with the progressive moulting of these juvenile primaries. When all ten are replaced by adult feathers, the bird is probably out of the nest from three to five months. To relate this moulting with exact age, an intensive study of captive doves will be required. In the meanwhile, comparative ages can be told from the duration of juvenile primaries.

Charting of juvenile primaries showed interesting results. Doves with no juvenile primaries remaining are not all fully adult. Often the tenth primary is not of full adult length and such a bird is a juvenile of the year. When all ten primaries are adult feathers, it is impossible to tell whether the bird is an adult or a fully-plumaged juvenile of the year until the sexual organs are examined. The wings examined showed a progressive dropping of juvenile primaries as the season advanced until, in December and January, few birds were found with juvenile primaries remaining.

BANDING OPERATIONS

Livetrapping and banding are essential to the study of dove movements and migrations. Plans of a dove trap and directions for its use may be had from Federal Aid Branch, U.S. Fish & Wildlife Service, Atlanta, Georgia. All banding station operators should adhere to the procedure outlined by the Fish & Wildlife Service. This is essential to the accuracy of the Service's records. Also, the full coordination of this dove research program requires that all records be uniformally kept in an up-to-date and accurate manner.

The U.S. Fish & Wildlife Service has requested all cooperating bird banders to increase their dove banding. State dove research projects may get some assistance from these cooperative banders. A list of bird banders in each state can be obtained from the Bird Banding Section, U.S. Fish & Wildlife Service, Washington, D.C.

Arrangements for trapping and banding must be made through the Fish & Wildlife Service. The following regulations have been outlined by the Research Branch of the Service:

(a) One permit to one appropriate individual in each state will be issued.

1) If such an arrangement already exists for waterfowl or other state banding, no additional or separate set-up will be made for doves.

2) When making an application for a master permit, all existing, individual permits of other employees of the state unit should be turned in.

(b) Application for permit: Copies of application form 3-481 are obtainable from Patuxent Research Refuge, Laurel, Maryland. The form should be filled out fully and returned to that office.

(c) No permit will be issued until after form 3-481 is received and approved.

1) Sub-permits for collaborators may be obtained upon application from this office by the master permit holder.

(d) No bands or supplies will be issued until a permit has been issued.

1) Initial supply will be issued at the time that the permit is sent.

2) Subsequent supplies are to be ordered on form 3-644 which must bear the permit number and signature of the master permit holder.

3) Permit holders will be responsible for distributing bands to other employees and collaborators of the state and will be held responsible for subsequently accounting for all bands and for correctly preparing and promptly submitting once a month the required reports (schedules 3-860 and return cards 3-137) directly to the Washington Office. (Note: no additional bands will be issued to any state failing to submit the proper reports once a month until such time as their reports are up to date).

(e) Refuge employees (FWS) and individual banding cooperators do not enter into the state project. Each will use their own bands and there should be no exchange of bands.

(f) Instructions and policies as stated in the Manual and as amended and stated in the June 1943 issued of Bird Banding Notes apply equally to all the dove banding. (Copies of these are supplied to each new bander).

To further clarify the general procedure for state project leaders we discuss the matter further.

One representative from each state, who is himself actively engaged in the banding, should be put in charge of keeping the records and issuing the bands to all other state collaborators. This would usually be the State project leaders on the P-R dove project. A master permit would be issued to this person and sub-permits would be issued to all of the collaborators bearing the same number. All bands would be issued to the person holding the master permit and issue records would refer to his name only. He would, in turn, reissue the bands to sub-permit holders, keeping track of the inclusive number of bands issued to each. The schedules would bear in the upper right-hand corner the name of the State on the first line, the name of the permit holder on the second line, and the name of the actual bander and actual location of the banding would be shown under "substations" in the body of the schedule. Copies of Bird Banding Notes, Vol. 4, No. 1, which gives complete instructions on the preparation of banding records will be supplied to each sub-permit holder. The holder of the master permit would be responsible for having schedules of all of his collaborators in the proper order and sent in to the bird-banding office promptly.

In the event that there is cooperation in this project by refuge personnel who already hold banding permits, it is thought best to have the banding done under their permits and for them to submit schedules and apply for bird bands independently as in the past rather than through the official state representative. This would hold for any private bird banders who already hold permits also, since it is felt that there would be considerable confusion resulting in the record-keeping if such persons shifted to the use of bands issued to the states. In the past this has brought about the mixing of records of bands issued to different people with resulting confusion in the records. From now on it will be important to keep track of all persons who are banding mourning doves so that it will be possible to assemble all records whether they issue from the new project or not.

EMPLOYMENT

We anticipate that all of the Southeastern States, and others beyond this region, will eventually have dove research projects. Well-trained wildlife technicians will be required for leaders of these projects. Three positions are now open in the Southeast. If you are interested in employment in this region, information may be secured from the Federal Aid Branch, U.S. Fish & Wildlife Service, Atlanta, Georgia. For opportunities in other regions inquire of the Federal Aid Division, U.S. Fish & Wildlife Service, Washington, D.C.

IN CONCLUSION

This, the first of the dove newsletters, is necessarily limited to rather general material dealing with the opening stages of the program. As research progresses, more detailed and interesting data will be available. Also, we should like to include personal items concerning the field men. Please help us by sending news items to:

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MOURNING DOVE NEWSLETTER

(Not for publication)

Issue No. 1 (Supplement) March 1949

In conjunction with the 14th North American Wildlife Conference, a mourning dove cooperators meeting was held in the Hotel Statler on Monday, March 7, 1949. This supplement to the Newsletter contains a list of cooperators present at this meeting and a brief transcript of the proceedings. For additional information write directly to the person making the remarks.

The Illinois Natural History Survey has commenced a dove project similar to those in the Southeast. For information, contact Harold Hansen, Illinois Natural History Survey, University of Illinois, Urbana, Illinois.

Additional copies of Issue No. 1 of the Mourning Dove Newsletter (February, 1949) and of sample mourning dove project and work plans may be obtained from the Federal Aid Branch, U. S. Fish and Wildlife Service, Glenn Building, Atlanta 3, Georgia.

Attendance
COOPERATIVE DOVE DISCUSSION

Monday, March 7, 1949
Continental Room, Hotel Statler
3:30 P.M. - 5:30 P.M.

John W. Aldrich	U. S. Fish and Wildlife Service, Washington, D. C.
Harold E. Alexander	Division of Game and Fish, Frankfort, Ky.
E. L. Atwood	U. S. Fish and Wildlife Service, Washington, D. C.
Maurice Baker	Wildlife Building, Columbia, Mo.
F. S. Barkalow, Jr.	North Carolina State College, Raleigh, N. C.
William B. Barnes	Indiana Department of Conservation, Indianapolis, Ind.
Robert A. Bowman	Ohio State University, Columbus, O.
John S. Campbell	Department of Fish and Game, Baton Rouge, La.
Joe Davidson	Illinois Department of Conservation, Springfield, Ill.
W. B. Davis	Texas A. and M. College, College Station, Texas
Jim Durell	Hodgenville, Ky.
Allen J. Duvall	U. S. Fish and Wildlife Service, Washington, D. C.
V. F. Flyger	Department of Research and Education, Solomons, Md.
Leonard E. Foote	W. M. I. Field Representative, Marietta, Ga.
R. M. Freeman	Mississippi Game and Fish Commission, Jackson, Miss.
O. E. Frye, Jr.	Florida Game and Fresh Water Fish Commission, Tallahassee, Fla.
Ira N. Gabrielson	W. M. I. President, 824 Investment Building, Washington, D. C.
Louis F. Gainey	Louisiana State University, Baton Rouge, La.

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David R. Gascoyne	U. S. Fish and Wildlife Service, Washington, D. C.
Leslie L. Glasgow	Louisiana State University, Baton Rouge, La.
Phil Goodrum	U. S. Fish and Wildlife Service, Atlanta, Ga.
W. A. Gresh	U. S. Fish and Wildlife Service, Atlanta, Ga.
C. H. Gresham, Jr.	Louisiana State University, Baton Rouge, La.
Rolland Handley	Ohio State University, Columbus, O.
T. H. Holder	Arkansas Game and Fish Commission, Little Rock, Ark.
Thomas H. Jones	Georgia State Game and Fish Commission, Atlanta, Ga.
Daniel W. Lay	Te
Daniel W. Lay	Texas Game, Fish and Oyster Commission, Austin, Texas
Frederick C. Lincoln	U. S. Fish and Wildlife Service, Washington, D. C.
Seth H. Low	U. S. Fish and Wildlife Service, Laurel, Md.
R. D. McDowell	Pennsylvania Game Commission, Harrisburg, Pa.
Albert J. Marsh	Division of Game and Fish, Nashville, Tenn.
Ernest C. Martin	Department of Conservation, Montgomery, Ala.
George C. Moore	U. S. Fish and Wildlife Service, Atlanta, Ga.
Robert W. Murray	Game and Fresh Water Fish Commission, Chipley, Fla.
John D. Newsom	Louisiana State University, Baton Rouge, La.
Hayden Olds	Wildlife Resources Commission, Raleigh, N. C.
Harold S. Peters	U. S. Fish and Wildlife Service, Washington, D. C.
C. B. Pierle	Division of Game and Fish, Nashville, Tenn.
H. R. Redmond	Louisiana State University, Baton Rouge, La.
Eugene Schwall	Wildlife Resources Commission, Raleigh, N. C.
Parker B. Smith	P. O. Box 746, Paris, Tenn.
Harold E. Wallace	U. S. Fish and Wildlife Service, Atlanta, Ga.
Lloyd G. Webb	Wildlife Research Unit, Ohio State University, Columbus, O.
F. A. Winston	Purdue University, Lafayette, Ind.
Richard K. Yancey	Louisiana State University, Baton Rouge, La.

Transcript of Dove Discussion

R. M. Freeman, Mississippi - Doves are becoming scarcer in Mississippi and hunting has increased. Ninety-two percent of September doves we examined were young. September is a little early for shooting doves. We have started our program and are trying to do a reasonable job. Our quail population has gone down also. If we can obtain enough information with all states cooperating, we can recommend seasons on doves in the Southeast. Federal Aid Projects have been approved in six states. Peters, Moore, and Foote, are acting as a coordinating committee.

George Moore, Georgia - Mississippi was first to start on the dove project-Freeman has brought in part of his law enforcement staff, and submitted the first project. Requested as many as possible to follow the work plans. Migration movements might be caused by hunting pressure or by weather in the Southeast. Controversy in the Southeast as to when the season might be best suited for hunters. Important to us to know when the birds might be moving within the state as well as throughout the region. We hope that the states north of Georgia will undertake some type of banding so information on movements can be obtained. Pennsylvania, Maryland, New York, West Virginia, Ohio (Unit), Virginia, Illinois, Montana, all are doing some work. Particularly interested in banding. Appreciate all banding we can get done. Work plans and jobs planned by Atlanta can be fitted into the states' programs. Would appreciate any ideas. A newsletter to be put out at regular intervals which will give a good idea on what has been taking place on this job. Trapping is best now. We tried nets in Alabama but found this potter trap was the most effective. We are encouraging all other states to try the other means which they know and would like to get their opinions on best trapping methods.

Seth Low, Maryland - There is bad news for the dove, in regard to traps, in George Moore's program. Every song sparrow or field mouse will spring the trap. Suggest a modified trap two or three feet high with a small funnel entrance on each side. Solid portable frame and set up in sections as you want them. Two or three were used on Cape Cod and still are being used at the Austin Station. Should be able to get large numbers of doves with it. (See Dove Newsletter, Issue No. 1, February 1949, for information on handling of banding records, etc.)

Harold Peters, D. C. - We have a summary of banding returns in our files. Have banded 34,000 eastern doves, with 1140 returns outside of the immediate banding area. More education is needed on the part of the hunter to turn in bands. Urging all banding cooperators to make a special effort to band fledglings. Trapping idea: throw a net over a baited area. Takes little ingenuity. Developing something like that would work okay.

Ira N. Gabrielson, D. C. - This sort of management identifies maturity - first sign which anyone has been able to see. Delighted to see it. Black duck program was one of the first to be developed and to grow out of cooperation. Was successful enough to act as a stimulus. You are beginning to produce results. More and more tired of going to sportsmen's meetings and listening to alleged sportsmen tell how to get the job done with no action behind it. You have taken a tremendous step forward. Data finally brought together and put on a basis shows what is going on. I hope you will keep this going so it will reproduce results.

Seth Low, Maryland - We are trying to set up each states' banding through a master's permit with one set of bands and one set of records and one individual to keep bands filed separately to avoid mix-ups. Each states is responsible. Draw bands from one individual and submit them to one individual. Two thousand doves were banded and only eight or ten recovered in North Carolina. In contrast, 106 recoveries - 20.4% of doves banded in Massachusetts. Nestling birds must be large enough to hold bands. New size especially for doves - No. 3A, half-way between No. 3 and No. 4. Individuals may write in and furnish carbon copies of our banding schedules. Lists can be obtained from the state department of the persons whom they could contact in their state. Records will also be provided. We would like for you to band all other species you can and we will furnish you with specifications but if there is any question about species, let it go. One hundred dove nestlings banded in Ohio - no returns yet. All left the nest.

George C. Moore, Georgia - Eight days is the minimum age to put on bands. Determine if birds were juvenile or adult by white fringe on tip of wing coverts. Would know the age up to a certain point. Birds hatched off in March or April would lose their juvenile characteristics before the summer was over. Early birds would nest so we assumed that they had reached sexual maturity.

Harold S. Peters, South Carolina - Foote and I have been working with state wardens and technicians to carry age examinations further. Started study in South Carolina beginning of dove season. Examined 1500 wings from a good many states. Virginia, North Carolina, South Carolina, Florida, Alabama, Mississippi, Tennessee, Kentucky,

Start to moult through middle of wing toward the tip. Tenth, or outer, primary feather last to drop. Easy to spread and tell quickly how many young and adult feathers there are in the wing. Cut wing near base. Wings won't spoil during examination - will keep a long time. Only chance to tell what hunter is shooting. Decide on few representative areas. Chart these feathers. You can tell the relative ages of the doves shot by hunters from specimens brought in. Southern Florida - only 1/2 of 1% of birds hunters were bagging were adult birds. Adult feather: bluish gray. Good square tips. Juvenile feather: white edge to feathers. Color, brownish gray. Pointed tips. Longer than adult primaries. We need some states to raise them in captivity and note the age at which juvenile primaries are replaced.

Leonard E. Foote, Georgia - Some hope for that method -- can be worked in ruffed grouse and pheasants. (Similar.)

Maurice Baker, Missouri - Observe in captivity this summer.

Leonard E. Foote, Georgia - We are going to continue to use George Moore's wing covert method until this is foolproof, however.

O. E. Frye, Jr., Florida - Perhaps the second-year birds are going through their second moult, some have white edging on second-or third-year birds.

Harold Peters, D. C. - Work until a state or two works out details. Birds with no adult primary - must have been out of the nest for a couple of weeks.

Allen J. Duvall, D. C. - A monograph on Columbidae, which may settle the moult question, is "An Orthogenetic Evolution in Pigeons" by C. O. Whitman, edited by Oscar Riddle after Whitman's death and published by Carnegie Institute of Washington in 1919. There are three volumes - one each on anatomy, genetics and behavior.

W. B. Barnes, Indiana - Information collected by Ed Ginn. Sportsmen say we raise doves for us to shoot ourselves. No shooting makes it harder to get appropriations on the study. Pheasant project - Northern Indiana made notes on doves seen. Thirty-two months of observation. Started about April in northern Indiana. Populations continued to increase until peak in August. Sixty-one observed per 100 miles. Population follows in September. By October populations mostly had left Indiana. From 10:00 after until 3:00, 30 doves per 100; 15 in midday, 21 in evening. Morning best

time to make observations. Group size - more than 1/2 were of single doves. Only 28 consist of eight or more in a flock. In September, we have had a roadside pheasant census. Pheasant survey carried on since '42. First week in September as a rule. One hundred-seventy were seen for every 100 miles we had driven. Dropped from 170 to 113. In 1946 and 1947 it came up somewhat but showed a decline over earlier years. Ninety percent of all doves observed were on wires. These were observed while taking pheasant survey.

Joe Davidson, Illinois - In Illinois, survey started middle summer. Trying to get information to combat bills on whether or not we hunt doves.

R. M. Freeman, Mississippi - Doves increased from .85 to 1.96 per mile from October to December, on road counts in Mississippi.

Leonard E. Foote, Georgia - Censusing of areas year after year will tend to substantiate banding records in relation to dove movements.

Lloyd Webb, Ohio - Records of our observations do not coincide with northern Indiana. Weather conditions, rather than time of day the observation is made appear important.

Harold E. Alexander, Kentucky - No work here. Observations made at start of hunting season. Holding records until we have a man to work on them. Intend to start P-R project as soon as possible.

Maurice Baker, Missouri - Roadside count. Chose to do it in June which in a way is bad because you are measuring in much of your reproduction. In each county of the state, the sample was designed to select a representative part of soil type of the state, Gradual decline 1.6 doves - harvest drop. In 1946 after the project was set up on a statewide basis, I checked the time of day on small route and over course of a couple of months, It looks as though, from my observations, that one or two hours after sunrise was the most effective time. Report counts proved that the count was the same. There is a lot we don't know about interpreting roadside information. One thing from roadside information, it seemed that there weren't many doves in the timber part of the state. One-tenth birds per mile. To check that, near Columbia, made counts of cooing heard from the road. Until the young became quite numerous, the more cooing you could hear the more birds you could see there were.. Under-

census, made several to back up banding information. The picture that was presented was that in the first week in June, young doves became more abundant and about 10th of June, they began to flock up. Flocks don't build up until the fifth of June. In May road counts, the numbers seen dropped. Seen in pairs of two's and no flocks. First two hatches were migrating in July. If same type of count had been going on the birds would have shown up. Field men made quick check.

Hayden Olds, North Carolina - Dove work is being put into effect at present time through a cooperative agreement between Wildlife Resources Commission and State College. Dr. Quay is analyzing this. Based on three-year's work done in North Carolina through the war. Federal Aid release. Probable bulletin on work done in North Carolina.

R. M. Freeman, Mississippi - Using roadside populations only as a trend.

Daniel W. Lay, Texas - A. S. Jackson's work in north Texas shows that doves water regularly each day. There is no water except in stock watering tanks and sampling the tanks might give count of birds. Agree with Goodrum that South Texas is an important wintering area.

Harold S. Peters, Florida - October and later part of November three-weeks shooting season doves were numerous in south Florida. Hunters had success - 50,000 doves killed in October. Wondered where they came from. Cuba? Examined West Indies for doves. Until 10th of November, found young birds in Florida. Out of about 670 wings examined, only about 1/2 of 1% were adults. No eastern doves found in Cuba and West Indies during January and February. Tentative plans to work in Cuba in September this next year. Doves do leave Cuba and it is said that they move to Mexico. Five doves banded on Key West, Florida have been killed in Cuba. Eastern or West Indian species. Don't know.

Frederick C. Lincoln, D. C. - I have been interested in this south Florida phenomena for several years. Banding station on Key West. I was responsible for recording those birds. Assumed that they were eastern mourning doves. West Indies dove never recorded in Continental America except one found in Tampa. Some exchange of birds. Don't know which ones. Some sportsmen insisted that numbers of these birds were

coming across the Keys during the hurricane. Flocks of 25,000 to 40,000 birds observed on Florida Keys. No place south of Miami that can produce birds in that quantity. Had the feeling they came from Cuba. Peters and Duvall worked in Del Rio, collected specimens. Finally found concentrations of mourning doves. But so far as I know, they were West Indian mourning doves. Where do they come from? Is it possible that these are doves coming down the Mississippi? Difficult to determine migration habits of birds. Many in Haiti, Del Rio, Cuba. Roadside counts in Cuba.

Leonard E. Foote, Georgia - Two years ago, we ran a brief bag check in Tennessee. Perhaps Al Marsh or Charles Pierle can recall these results.

Charles B. Pierle, Tennessee - Information in connection with our survey will be published when our project is completed. I cannot recall the exact figures offhand.

George C. Moore, Georgia - In Tennessee about 7,000 birds examined by wardens and several other people: Davis, Foote, and Tennessee P-R men. First 15 days examined nearly 5,000 and the rest of the 7,000 were examined in the last 15 days. Birds left for the south, maybe Florida, around the 15th or else an effort wasn't made to count as many then as during the first 15 days. Birds feeding young went up in percentage the last 15 days. Seven percent of birds examined from hunters' bags were still feeding young in the nest in September. Each state can publish their part as a separate report. Then all information will be corporated into an overall report and published as such.

Leonard E. Foote, Georgia - It will be started about three or five years from now and it is possible that the Wildlife Management Institute will publish the full report in book form. Peters is compiling summary of bibliography - more important works on mourning doves will be furnished to all cooperators. (Harold Hansen has done this also.)

Albert J. Marsh, Tennessee - What means are you handling protection of banders of migratory birds? Can we obtain permits from SethLow to show law enforcement agents? (See Dove Newsletter No. 1)

Lloyd G. Webb, Ohio - Nesting activities - had results in marked birds. In attempt to determine their territory. Seven pairs of marked birds observed through the

season. In only two cases did the bird utilize the same nest. Two were in the same three; two used three trees; and one made six nests in seven nesting attempts. Night feeding is more or less important. Information on daily activity of incubation and nestling stages will be published.

Frederick C. Lincoln, D. C. - Last two years, the Fish and Wildlife Service has been carrying on series of public hearings on migratory waterfowl under Dr. Clarence Cottam. This year making plans for continuation of this. Dr. Cottam said last fall that he wanted to include the mourning dove especially in the Southeast and wanted something of a graph to be used in these meetings. We need copies of figures for the graph. Trends in mourning dove populations in the past ten years. No scientific information is available. But have in mind to make such a graph from the best information obtainable. Population in the Southeast has dropped, stayed down at bottom point after freeze of 1940 for about a year or two and gradually came back, until 1945 or 1946 when there has been some drop. But never came back to level of 1940. Decrease at the present time. Less than last year or the year before. How high did they reach after their 1940 catastrophe? Decrease could be due to hunting.

E. L. Atwood, D. C. - The population never reached the 1940 figure. Change over in manner of harvesting rice in Louisiana and Arkansas prior to the war. Was done by a separator and since then rapid change to the combine. In prior years, the separator wasted grain furnishing feed for doves and doves were hunted heavily in these areas. During 1945 and 1946 had occasion to make roadside count in September and up to October - definite increase in dove population. Would support the observations of local movements in the Mississippi areas. Build-up in late September and early October is normal, during no period of 1947 were there any tremendous build-ups in this area that may have occurred in this section with which I am familiar. Check with George Lowery.

John S. Campbell, Louisiana - Harvesting rice causes quite a commotion in our state.

T. H. Holder, Arkansas - Harvesting rice leaves rice in fields where doves can get it. Hauling rice across fields and roads - it is wind blown onto road edges. Perhaps doves are picking up rice instead of gravel.

Ernest C. Martin, Alabama - If the doves were hunted, they would be chased from one field into another instead of being shot out, then going back into the same field. Big grain increase in northern Alabama. Other states making attempts on hunting pressure. We are conducting questionnaire getting number of dove hunters we do have, how many times they hunted last year. Have contacted 600 hunters. None, of course, are satisfied with the dove season.

Leonard E. Foote

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Federal Aid Branch
U.S. FISH AND WILDLIFE SERVICE
Atlanta, Georgia

MOURNING DOVE NEWSLETTER

(Not for publication)

Issue No. 2 September 1949

This is the second regular issue of the Mourning Dove Newsletter. A supplement to No. 1 was issued immediately following the meeting of all parties interested in mourning doves in conjunction with the 14th North American Wildlife Conference.

This issue follows a three-day conference of all leaders of the dove project in the Southeast and cooperating agents. This issue will be devoted mainly to subjects discussed at this meeting with a brief annual summary of activities of the projects cooperating in the Southeastern Dove Study.

REGIONAL DOVE CONFERENCE

A conference of all regional dove project leaders and other interested individuals was held in Atlanta, Georgia, on August 23, 24, and 25. The purpose of this conference was to discuss the problems that have arisen during the first year of operation and to revise work plans so it will come nearer giving us the answer to the complex dove problem in the Southeast. All phases of the project and work plans were discussed. Considerable time was spent in discussing methods and techniques for collecting and reporting data. One day was spent in the field where 12 types of dove traps were in operation. Traps, trapping techniques, and baits entered heavily into the discussion since all states wanted to know how to trap more and more doves.

Attendance

James Silver, Regional Director, Fish and Wildlife Service, Atlanta
Dr. Logan Bennett, Chief, Research Division, Fish and Wildlife Service, Washington
Edward Carlson, Section of Research, Division of Federal Aid, F&WS, Washington
C. W. Watson, Regional Supervisor, Fedl. Aid Division, F&WS, Atlanta
George C. Moore, Assoc. Reg. Supervisor, " " " "
H. E. Wallace, " " " " " " "
Harold Peters, Biologist, Research Division, F&WS, Atlanta
Leonard Foote, Regional Representative, Wildl. Mgmt. Inst., Marietta, Ga.
Phil Goodrum, Biologist, Research Division, F&WS, Atlanta
W. T. Davis, Supervisor, Game Management Section, F&WS, Atlanta
E. C. Martin, Coordinator, Ala. Dept. of Conservation, Montgomery
James Keeler, Leader, Dove Project, Ala. Dept. of Cons., Montgomery
David Donaldson, Leader, Dove Project, Paragould, Arkansas
Frank Winston, Dove Project Leader, Venice, Florida
Lloyd Webb, Leader, Coastal Plains Wildlife Research Sta., Albany, Ga.

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Dan Nelson, Leader, Dove Project, Ga. Game & Fish Commission, Atlanta
Don Strode, Asst. Coordinator, Kentucky Div. of Game & Fish, Frankfort
Dan Russell, Leader, Dove Project, Buffalo, Kentucky
Lyle St. Amant, Asst. Coordinator, P.O. Box 9055, University Station,
Baton Rouge, Louisiana
John Newsom, Leader, Dove Project, P.O. Box 9055, University Station,
Baton Rouge, Louisiana
St. Clair Thompson, Leader, Dove Project, Miss. Game & Fish Commission,
Jackson
Don Allison, Leader, Dove Project, N. C. Wildlife Resources Comm.,
Raleigh
Tom Quay, Professor, N. C. State College, Raleigh
James W. Webb, Coordinator, S. C. Dept. of Game & Fish, Columbia
James Hammond, Asst. Leader, Dove Project, Tenn. Game & Fish Comm.,
Nashville

AGENDA

Work Plan, Field Data Sheets, and Reports

In general, the work plan and field data sheets were found satisfactory and flexible enough for use in all states. Minor revision may be made by the individual states to meet local needs without notifying the Regional Office. Major changes or new jobs in the work plan should be approved by the Regional Office. It is imperative that the same data be collected throughout the region and in general the same procedure be followed.

The population and movement studies will be carried out as outlined in the original work plan. However, it was agreed that a new job should be set up to give a clearer picture of the breeding populations in the states. This would be incorporated into the work plan and consist of one or more study areas, in each major ecological type, on which population studies would be made at approximately monthly intervals during the breeding season. Since the total fluctuating population is all that is desired, it will not be necessary to make a study of all nest or nesting attempts. These data can be gathered by cooing, counting the number of nests, number of birds seen on the area, or by other techniques to be developed. Ideas and suggestions that will help in this study will be welcomed.

All project leaders expressed the desire to see quarterly reports from each state to compare the style, data collected, and progress with work in their state. The Federal Aid Division agreed to route copies of the reports to the various states as soon as they are available. The question of time element was discussed and all states agreed to send two extra copies (four copies total) so the region could be divided for convenience in routing these reports.

The annual report should be submitted at the end of June each year and it should be separate from the fourth quarterly report due at the same time.

The final report will be published as a separate state publication but the entire study will be consolidated into a complete monograph of the mourning dove with each project leader as joint author.

Traps and Baits

On August 24, the experimental dove trapping station near Roswell, Georgia, was visited. Twelve types of traps were inspected and the advantages and disadvantages of each kind were discussed. Emphasis was placed on the need for some sort of ever-set trap which will catch large numbers of doves. All types of traps caught birds, but a trap similar to the clover-leaf may be most suitable of those yet tested. No effort has been made to use nets or drop traps during this study. It was emphasized that a good dove trap has not been developed, therefore each state should seek and try new ideas.

Welded wire, 1-inch poultry netting, and hardware cloth are most commonly used. The welded wire gives a more rigid trap. Portability is another important factor to consider in traps. Net may be used for top.

It is believed to be unwise to encourage one standard trap for the entire region. There are too many variables throughout the Southeast to standardize traps, baits, or trapping conditions.

The consensus expressed at this meeting is that either cracked corn, wheat, or a combination of these two grains is the best all around bait. A mixture of one part wheat, one part grain sorghum, and two parts corn which could be prepared by the states was recommended as a good bait.

Trapping Procedure

All states follow the same pattern in getting trappers, although methods of pay vary from state to state. The bulk of the trappers are school or farm boys who can operate a trapping station in the vicinity of their homes. Another group comprises individuals who are extremely interested in birds and operate traps at no cost. Usually the trappers are selected by contacting the schools, county agents, 4-H Club leaders, and other youth group leaders. As soon as a concentration of birds is located, the project leader contacts some individual about running a trapping station. Arrangements are made and the station is operated as long as the catch is large enough to justify operation.

Reimbursement varies from state to state, but generally most cooperators are paid at the rate of $10.00 per month. Trapping and payment stops as soon as the catch does not justify operation of the station. This is left to the judgment of individual project leaders.

The project leader and cooperators should give the program as much publicity as possible, not only to guarantee a large percentage of band returns, but to hold down criticism.

The number of stations per state and the number of traps per station varies. The minimum of 20 stations per state will probably be exceeded in most states. It is believed that large numbers of traps per station is beneficial as trapped birds seem to act as decoys.

Permits, Banding, and Reporting Data

The master permit is obtained from the Fish and Wildlife Service and is usually issued to the project leader. The master permit holder in turn issues sub-permits to each station operator. It is the responsibility of the master permit holder to see that all records are accurate and all bands reported.

Bands will be obtained from the Fish and Wildlife Service. The master permit holder will furnish bands to all cooperators banding under his permit. The new size 3A band is satisfactory except on very young nestlings. For this reason it was recommended that no bands be put on nestlings before 8 days of age.

Since there has been some confusion regarding the reporting of banded birds to the Fish and Wildlife Service, the State men agreed to send banding schedules to the Bird Banding office once each month.

Collecting and Reporting Data

All doves should be aged insofar as it is accurately possible to do so. Only those birds retaining the white fringe on the tips of the coverts should be considered juveniles. Birds banded while in the nest should be reported as nestlings. All others are listed as adults. It is impossible to accurately sex mourning doves externally, therefore, birds trapped should not be sexed.

Each project leader should gather as much data concerning the ecology of the station as possible. He should select his station at widely scattered intervals to get a good coverage of his state.

Baiting and Law Enforcement

Since many questions have arisen on bait and its relationship to the law enforcement problem, Bill Davis discussed this phase of the dove study. In view of the fact that the trapping activities will continue through the open hunting season on mourning doves, it is suggested that trapping stations be located on farms where no hunting is permitted by the owner, or that the area where trapping operations are in progress and feed is used in connection therewith be conspicuously posted so as to warn hunters that the area is baited.

When it is deemed advisable to discontinue trapping operations where baiting has been resorted to in order to attract the birds, shooting should not be permitted in these areas for a period of at least two weeks. It is therefore suggested that in areas where there may be heavy hunting pressure your trapping activities be discontinued at least two weeks prior to the opening of the season.

In the event any of the project leaders or cooperators have a need for the services or advice of any Game Management Agents, please feel free to call upon them. No doubt their advice in connection with shooting in the vicinity of trapping areas where bait is being used could be used by project leaders to good advantage.

Cooperating Agent

Harold S. Peters, Branch of Wildlife Research, has been assigned to work on the mourning dove. His contribution will be directed toward securing data in states north of Region 4 to supplement the information gathered in this region. His duties are listed below. If assistance can be furnished Mr. Peters in this dove study, contact him at U. S. Fish and Wildlife Service, Atlanta, Georgia.

a. Will prepare abstract of annual reports submitted by dove project leaders in Region 4, and include work outside of the region.

b. Will prepare a periodical summary of returns from banded doves from return sheets sent him by Patuxent Refuge, Laurel, Md. This will be mimeographed for distribution, and will include all returns for the Eastern Mourning Dove.

c. Prepare abstracts of dove literature from time to time. This will be mimeographed for distribution. Project leaders are requested to send him references which they believe would be of importance and interest to all dove workers.

d. Contact all states outside of Region 4, in the range of the Eastern Mourning Dove, in efforts to secure their participation in various phases of the dove study, and to obtain information on such work.

e. Undertake active field investigations in Ohio and Indiana to secure information on nesting populations, migrations, and also band numbers of nestling and flying doves. This will be done during the nesting season of 1950 after a short survey trip in September 1949. It is hoped to secure assistance of biologists and interested cooperators in this work as far as possible.

f. During August 1949, the following mimeographed reports were prepared as basic information for the project leaders: "Analysis of Returns from Banded Eastern Mourning Doves"; "The More Important Literature on Mourning Doves"; and "A Summary Report of the Mourning Dove Project, fiscal year 1949".

Miscellaneous

The use of decoys was discussed. No one had tried it although it was agreed that it might be helpful. Additional thought will be given this technique and put into practice if found practical.

Several questions such as marking birds for study, baiting birds to concentrate them, prebait trap, and census techniques were discussed. No definite application was suggested, but all states will try these methods of collecting data and report their findings in the quarterly reports. New

techniques will be reported in future newsletters.

Suggestions for marking birds, census techniques, population figures, data on novements and other pertinent data will be appreciated.

Assistance and suggestions for setting up projects or collecting data will be given on request.

Reproduced December 1956

A SUMMARY REPORT OF THE MOURNING DOVE PROJECT
FISCAL YEAR 1949

Abstracted from quarterly reports of State dove project leaders by:

Harold S. Peters, Flyway Biologist
Branch of Wildlife Research
Fish and Wildlife Service

The southeastern states comprising Region 4 of the Fish and Wildlife Service set up a Mourning Dove Project under the Federal Aid program at the beginning of fiscal year 1949. Due to the delay in writing up the projects and securing trained personnel to head the work in each state, only six were able to begin work during the year. A list of these, with the leader and date of starting on the project, follows:

State	Project No.	Leader	Project Started
Alabama	22-R	James E. Keeler	Sept. 15, 1948
Arkansas	24-R	David M. Donaldson	Oct. 1, 1948
Florida	22-R	Frank A. Winston	April 15, 1949
Mississippi	25-R	St. Clair Thompson	Aug. 1, 1948
South Carolina	11-R	James W. Webb	June 1, 1949
Tennessee	11-R	James W. Hammond	Nov. 1, 1948

Each project leader has submitted quarterly reports to the regional office. These have been abstracted and the information has been divided into several sections in the present summary. The activities on these projects have consisted mainly of construction of traps, selection of banding stations, and training of personnel for the intensive banding program; a study of movements and populations of doves during each month; preliminary investigations of nesting and life history; roadside census; and some examination of hunters' bags during the legal shooting season. The results of these activities are summarized in the following sections.

ACTIVITIES OF PROJECTS

Alabama

Oct.-Dec. : Roadside counts, hunters' bag checks, trap construction and distribution.
Jan.-March: Roadside counts, setting up trapping stations, contacting sportsmen for kill data, looking for nests.
April-June: Roadside counts, setting up trapping stations, trapping doves.

Arkansas

Oct.-Dec. : Checking hunters' bags, studying movements and populations.
Jan.-March: Set up 14 trapping stations (college student, high school students, war veterans on farms).
April-June: Organization of trapping stations, studied populations and nesting.

lorida

pril-June: Contacts with colleges and possible cooperators, construction of traps, and selection of banding areas.

ississippi

eptember : Trap construction, hunters' bag checks, roadside counts.
ct.-Dec. : Trap construction, roadside counts, hunters' bag checks.
an.-Mar. : Trap construction, trapping and setting up stations, breeding studies.
pril-June: Trapping and nesting studied. New type trap developed (Thompson trap).

outh Carolina

pril-June: Selection of banding areas and road counts.

ennessee

ov.-Dec. : Contacting sportsmen and others to organize trapping program, and study of populations.
an.-March: Arranging for banding stations, constructing traps, and breeding studies.
pril-June: Trapping stations organized; some breeding studies. Wardens aided in road counts so total mileage for quarter was 55,584.

NOTES ON MOVEMENTS AND POPULATIONS

labama

ct.-Dec. : Steady increase of doves migrating into the state. More abundant in southern third of state due to abundance of peanuts.
Jan.-March: Difficult to trap doves in southern part of state because of abundance of peanuts. Found that replies to wardens' questionnaires on populations and movements varied too much to be useful. Majority of doves have paired off by end of March and flocks are seen only occasionally.
April-June: More abundant in northern third of state. Residents report more doves present than during recent years.

Arkansas

Oct.-Dec. : General exodus of birds during latter part of October, at first cold spell. Very few doves in entire state in November and most of December. Migratory birds began to arrive in mid-December.
Jan.-March: Largest dove concentration found in rice-growing sections.
April-June: Most doves in central, northeastern, and eastern section; very few in western section. Considerable number in rice sections, but scattered.

Mississippi

Oct.-Dec. : Concentrations mostly in Yazoo-Mississippi Delta region. Population steadily increased during the quarter.

Jan.-March: Concentrations in Yazoo-Mississippi Delta and extreme southeastern section. A light snow on January 30 caused doves to shift.
April-June: Nesting seems to be concentrated along Silver Creek in Humphreys and Yazoo Counties. Some moulting began in May.

Tennessee

Sept.-Dec.: Good dove population in September, but a decline during October. The last of October migrants began to arrive and lasted until late November. Population decreased during December.
Jan.-March: Doves reached lowest ebb from late January to third week of February. Increase noted in late February and early March.
April-June: Doves started congregating in early June, looking for supply of food.

HUNTERS' BAG EXAMINATIONS

Dove Hunting Seasons 1948-49

Alabama	November 25 - January 8
Arkansas	September 10 - October 24
Mississippi	Sept. 16 - Oct. 5; Dec. 16 - Jan. 4
Tennessee	September 10 - October 24

Alabama

Nov. 29-Dec. 28: 58 male; 42 female; 58 juvenile. Total - 158.
2575 estimated doves present.
None of adults were breeding.
90% killed between 3:00 and 4:30 p.m.

Arkansas

Sept. 10-Oct.24: 84 male; 28 female; 200 juvenile. Total - 312.
(27 males and 5 females were breeders = 29% of adults).

Mississippi

	First Period	Second Period	Total
Bags checked	312	87	399
Doves	1599 (28 breeders)	446	2045
Doves per hunter	5.1	5.1	5.1
Sex ratio (male:female)	147:100	133:100	141:100
Age ratio* (juv.:adult)	154:100	21:100	

* Based on primary coverts only.

A September season causes doves to face abnormally high hunting pressure. More hunters were out the first period but hunting success was same for both periods.

Tennessee

No checks - project not started.

DOVES BANDED

	Alabama	Arkansas	South Carolina	Mississippi	Tennessee	Total
ct.-Dec. :	27	0	0	0	0	27
an.-March:	148	328	0	184	0	660
pril-June:	535	373	35	281	58	1282
Total:	710	701	35	465	58	1969
o. Nestlings nc. in Total:	38	?	?	75	9	122
rapping Began:	Dec.	Feb. 8	June 1	Feb. 8	May 2	
o. banding tations	8	14	1	3	6	32

The 2-cell Potter traps used by most states. The recently developed hompson trap (Mississippi) seems to give better results.

SUMMARY OF NESTING DATA

	Alabama	Arkansas	Mississippi	Tennessee
irst cooing:	Jan. 21		1st wk. Feb.	
irst nest found:		March 24	February 23	March 8
umber of nests studied:	16	12	48	28
uccessful nests:		58%	54%	50%

Moulting of adults was first noticed in Mississippi in May with a consequent drop in nesting activities. There was a noticeable increase in nesting in ate June.

Blue Jays, Bronzed Grackles, shrikes, wind and hail believed to have estroyed most of nests.

SUMMARY OF ROADSIDE CENSUS

	Alabama			Arkansas			Mississippi			Tennessee			Totals		
	Miles	Doves	m.p.d.	Miles	Doves	m.p.d.	Miles	Doves	m.p.d.	Miles	Doves	m.p.d.	Miles	Doves	m.p.d.
ept.:							3633	2262	1.61				3633	2262	1.61
ct. :	4413	689	6.4				4566	3986	1.14				8979	4675	1.92
ov. :	3138	619	5.7				3382	3191	1.02				6420	3810	1.69
ec. :	2449	521	4.7				2040	3511	.58				4489	4032	1.11
Jan. :	1702	135	12.6				1770	4564	.39	1579	237	6.7	5051	4936	1.02
eb. :	1527	318	4.8				3535	4318	.82	1849	63	30.1	6911	4699	1.47
arch:	2012	128	15.7	4156	464	8.9	3910	3038	1.29	853	149	5.0	10931	3651	2.99
April:	1563	122	12.8				3049	1423	2.14	20586	2939	6.2	25198	4484	5.62
ay :	2685	270	9.4				3167	694	4.59	26336	5131	6.5	32189	6095	5.28
June :	2251	398	5.6				2193	587	3.74	8662	2066	4.8	13106	3051	4.29
Total	21740	3200	6.8	4156	464	8.9	31145	27574	1.13	58869		5.7		41695	2.80
& Av.											10585		116907		

A decided increase in doves is shown in the totals of all states for December and January with a low in April, May and June as nesting was under way.

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U. S. FISH AND WILDLIFE SERVICE
Atlanta, Georgia

sue No. 3 January 1951

MOURNING DOVE NEWSLETTER
(Not for publication)

INTRODUCTION

This is the third in a series of newsletters dealing with the coordinated urning Dove Study. The last issue was distributed in September 1949. However, nce then, the "Transactions of the Regional Dove Conference", held in Atlanta in ly 1950, were distributed to interested individuals.

The states in the Southeast, comprising Region 4* of the Fish and Wildlife rvice, undertook a regionwide coordinated dove study to determine population and oduction factors, and to discover the causes that influence local movements. To dertake this regionwide study, a uniform work plan was devised to carry out the llowing jobs:

1. Population and productivity study. This study will determine population trends and annual production indices.

2. Movements and survival studies. These objectives are to determine general, overall population movements; to designate population segments; and to determine annual rate of turnover in the dove population.

3. Hunting and kill data. This study is to determine the effects of hunting, which will give information on mortality, production, and movements.

Job I will depend on several methods of approach. To determine annual popution trends, a midwinter inventory is being carried out by the rural mail carriers. statistical analysis of the 1950 attempt is included in this newsletter. An rly morning count, at twenty stations on a 19-mile route once each month during rch, April, May, June, and July, will be undertaken to determine the breeding pulation and production index. One or more cooing routes will be established in ch major ecological zone in each state.

To determine movements and survival, an intensive banding program is in eration. Hunting and kill data will show hunting pressure, breeding success, ippling loss, and other factors that may influence mortality.

The study in the Southeast is set up so all states will be collecting infortion by using the same procedures. This is essential for ruling out variables

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The states that make up Region 4 are: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia.

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in analyzing results, but it is impossible for the Southeastern States to do th job alone. Fortunately, many cooperators throughout the United States who are interested in the dove are assisting in this study. Through the efforts of the Fish and Wildlife Service, Wildlife Management Institute, and the Southeastern Association of Game and Fish Commissioners, all cooperators have directed their efforts toward jobs of most value to the overall study. The interest shown by individuals who are cooperating with the states in Region 4 is appreciated, and their continued efforts will pay dividends in the final analysis.

The information presented in newsletters is gathered from sources througho the United States and presented in a concise manner for the benefit of all who are interested in the problems. Leonard Foote, Southeastern representative of the Wildlife Management Institute, has been very helpful in the study and, more or less, took the responsibility for all statistical work. H. S. Peters, of the U. S. Fish and Wildlife Service, is the coordinating agent for data gathere in all states outside of the Southeast.

The information presented in this newsletter is not final but is based on progress reports. An attempt has been made to analyze and present it in summar form to keep you informed as to what is being done, techniques used, and progre being made. If these data are sufficient to maintain interest and to provoke enough constructive comments to arouse a determined effort, the letter will have fulfilled its objectives.

POPULATION TRENDS

Data collected during the life of the various projects were analyzed to se if definite patterns regarding populations were evident. It should be understo that too few facts are known to give a clear picture, but this information and the possible meanings are presented in this newsletter to create interest in certain data and to provoke interest in collecting other facts. By relating th data to those presented herein, all cooperators can analyze their own data, which may show inadequacies.

Random Road Counts

During normal travel by State personnel, notes on the number of doves seen and the miles traveled are made. These types of data are somewhat questionable the information on hand indicates definite trends that point toward several significant facts. Figure I shows the dove population trends for the entire Southeast throughout the year. Some states have been collecting those data longer than others; therefore, the doves per 100 miles are weighted averages for each state by months.

Referring to Figure I, it is interesting to note that the populations show very definite trends throughout the region. By examining this series of curves variations are noted - seemingly with little or no explanation. The purpose of this analysis is not to give the impression that the study has reached definite conclusion regarding trends in the Southeast, but to pass along to you the many ideas so you may compare conditions as they exist in your state with the regional picture. You may be able to place emphasis on certain phases of this study so that a better picture of the dove situation will be formulated.

Some possible trends that these curves suggest are:

1. There appears to be a regionwide reduction in the dove population in midwinter, that is, between December and January. This reduction varies from a possible 21%, excluding Florida data, to approximately 81%, excluding only data collected from Mississippi. Considering data from all states, the population loss is approximately 42%. There are many variables that affect these curves; therefore, an additional curve omitting data collected from Florida and Mississippi was drawn. These data were considered separately because of factors found in these two states that seem to be unusual and better dealt with separately. The extremely high fall population in Florida tends to increase the average regional fall peak, whereas the almost complete absence of birds in Florida during February, as indicated by road counts, tends to lower the late winter peaks throughout the region. Data collected in Mississippi are based on large samples and the large concentrations of birds recorded during the fall and winter tend to increase the population peaks at this time of year for the entire region. Large concentrations at this time suggest the possibility that many birds use the Mississippi flyway and pass through Mississippi during the fall and spring migration. There are some data that lead one to believe that Mississippi is the state in which the flyways divide; many birds go eastward into South Florida and others westward to the East Texas coast. The big reduction in the number of doves seen during January may be caused by three factors, namely:

    (a) hunting - December and early January are the months when most hunting is done.

    (b) a wider dispersion of doves throughout the entire Southeast, including the more northern states - it is felt by some biologists that, by January, doves have already started moving into the northern parts of the Gulf States and into Tennessee and Kentucky.

    (c) winter mortality - heaviest mortality is normally expected during the winter.

2. These curves indicate a stable dove population during April, May, and June.

3. These data indicate that by July the population is increasing, which may be caused by two conditions, namely, locally-raised juveniles and early migrants.

4. These data indicate that the early fall peak is reached during August. Other data prove that the majority of the population at this time is made up of juveniles; therefore, it is logical to assume that some juvenile migration takes place during the late summer.

   Data gathered in all states, as well as those excluding Florida, indicate a fairly stable October population whereas data, excluding counts made in Mississippi and Florida, show a decided drop during October. Therefore, it would appear that most of the doves are in Mississippi and Florida during October. This would signify that the birds are in the region but are shifting southward, and road counts made on a regional basis do not show the almost complete exodus of birds from Kentucky, Tennessee, North Carolina and the northern parts of Alabama, South Carolina and Georgia during September and October each year. To get a true picture of population trends for management purposes, it will be necessary to separate data gathered in the coastal plains from those taken in the piedmont and northward.

5. These curves intimate that a larger number of doves is present in the Southeast, including Florida, during December than at any other time of the year. This does not take into account errors in sampling during various seasons. In other words, it may be easier to see birds during the winter than during the late summer or fall.

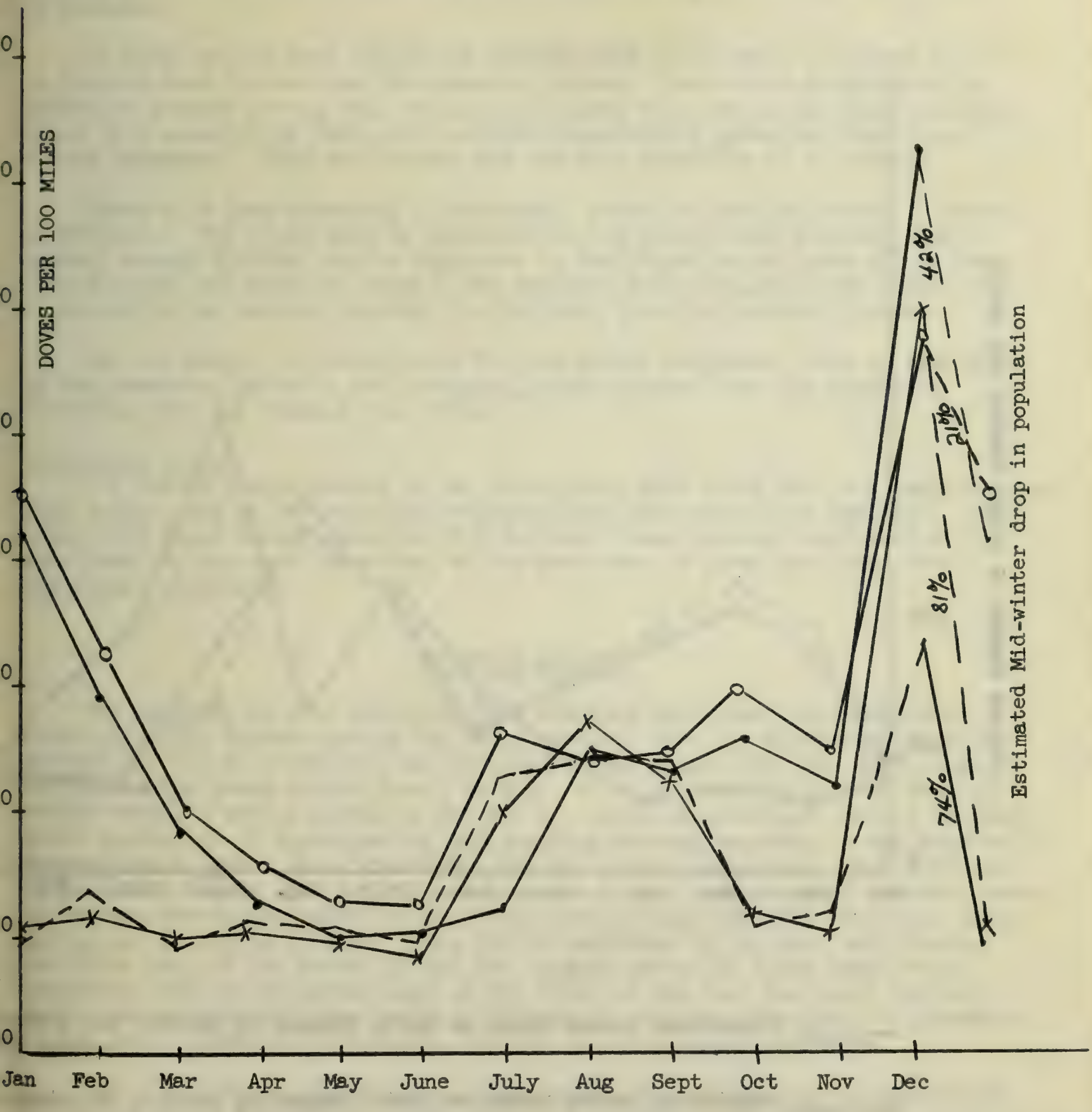
   The December peak may be explained by the arrival, from Florida and possibly the Texas coast, of late summer and early fall migrants into the majority of the Southeastern States at the same time the last northern birds reach the coastal states.

Trapping Data - Figure II

There are too many variables to give a true analysis of these data but they do give some possible suggestions. Comparing the average number of birds trapped each month with the roadside count, a parallel exists. The fall peak occurs in August but the trap data do not indicate a large population during December. The low catch at this time can probably be attributed to the abundan of food, whereas, the large catch during February, March, and April may indicat two facts; namely, the scarcity of food at this time of year and the fast turnover in the population, due to the spring migration.

These data also indicate that the peak of the breeding season is earlier i Florida than in other states and the possibility that some of the birds raised in the coastal belt may move northward during the summer. This northward movement, if occurring, extends into the piedmont and limestone valley sections of Georgia and possibly other states.

Figure I. Dove Population Trends Based on Random Road Counts
(Weighted averages)



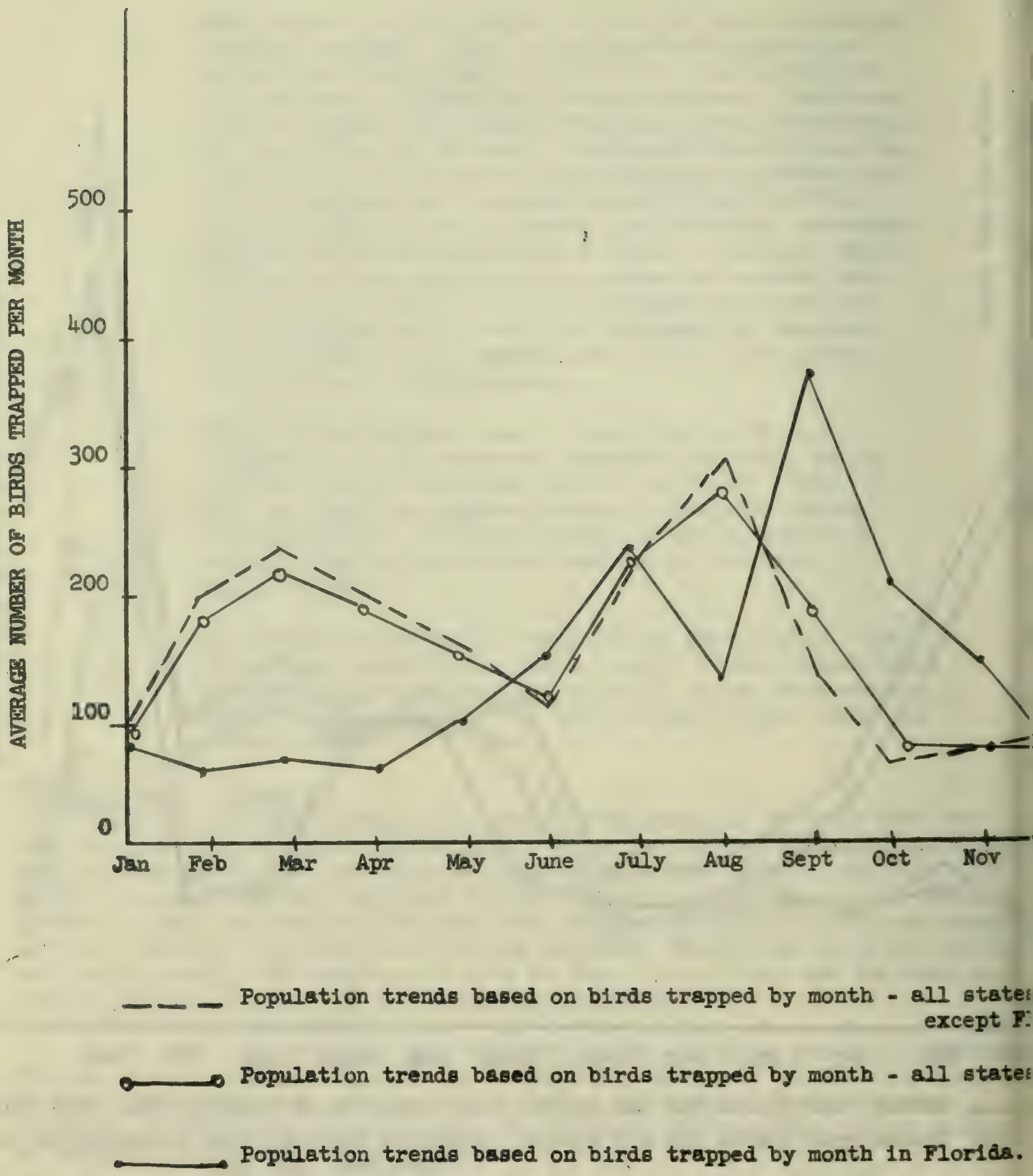
—● Random road counts for all states from inception of projects thru Sept. 30, 1950

—○ Random road counts for all states, excluding Florida, from inception of projects thru Sept. 30, 1950

—✗ Random road counts for all states, excluding Mississippi, from inception of projects thru Sept. 30, 1950

– – Random road counts for all states, excluding Miss. and Fla., from inception of projects thru Sept. 30, 1950

Figure II. Population trends based on birds trapped by month throughout the Southeast



Adult Juvenile Ratio - Figure III

These data may or may not indicate population trends but several facts are suggested. These data may represent only locally-raised birds, although indications are that the late summer and fall population peaks are partly made up of migrants.

It would appear that the spring nesting peak is at least one month earlier in Florida than in the other Southeastern States. There is a slight drop in juveniles trapped during July, which corresponds to a low in the summer nesting. There is a possibility that some northern movements of juveniles take place during midsummer. This may account for the drop occurring in all states.

There is a peak occurring in September, except in Florida, where it occurs in November. The rapid drop in juveniles during October and November in all states, except Florida, may be explained by the migration of birds of the year into Florida, and possibly Texas. The December drop throughout the region is explained by the natural molting of birds from juvenile to adult plumage.

The low number of juveniles in Florida during September, when it is highest in the remaining parts of the Southeast, would suggest that the migrating juveniles have not reached that state.

Controlled Counts

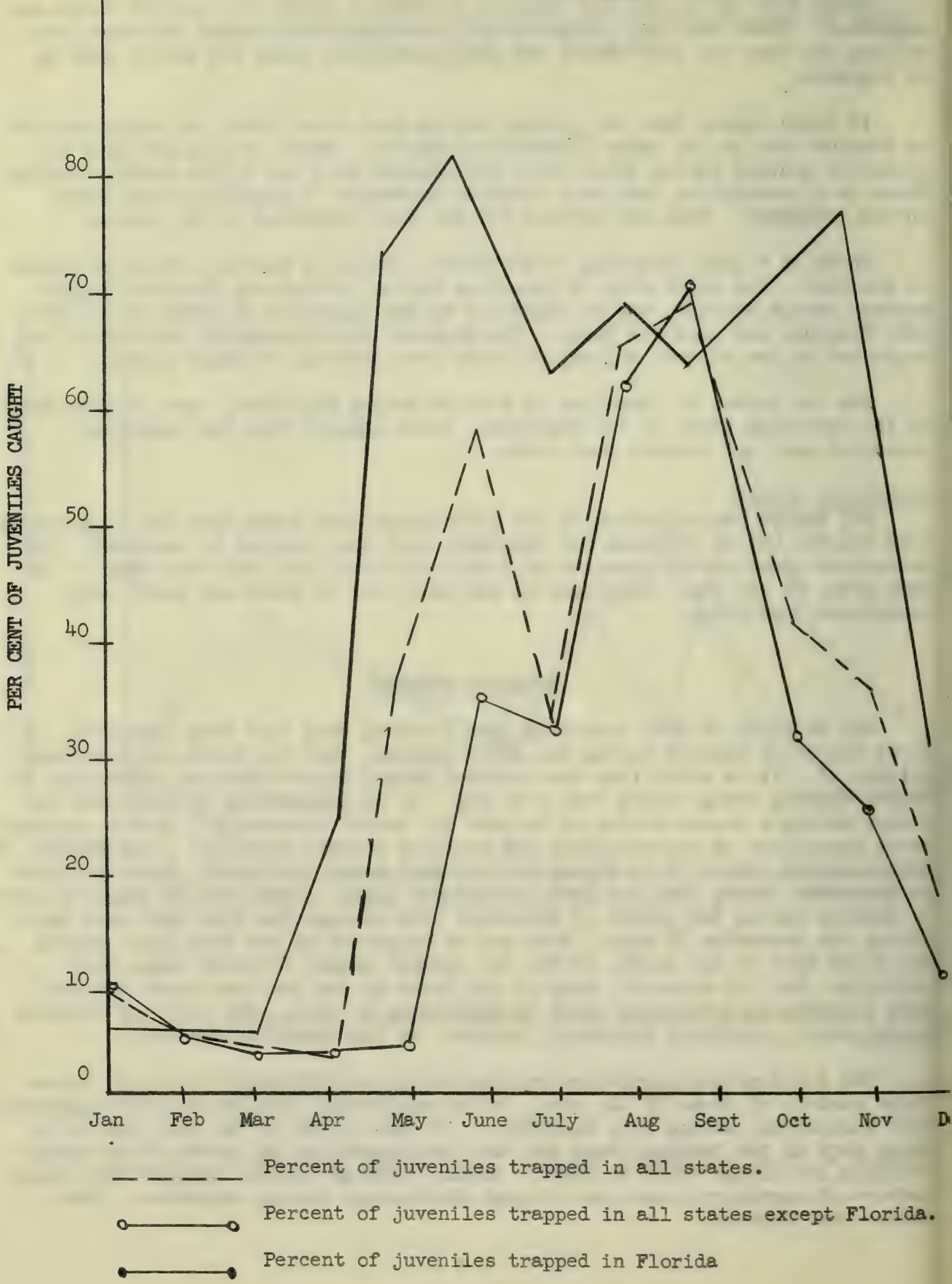
All states participating in the coordinated dove study have set up controlled road counts, but so few data are available that they can not be analyzed. The controlled count merely consists of a definite route run once each week at the same hour, by the same individual at the same rate of speed and under other controlled conditions.

BREEDING STUDIES

The majority of data regarding late breeding have come from examining birds killed by hunters during the early seasons, that is, September 1 through October 15. It is noted from the attached annual report that the percentage of adults feeding young varied from 2 to 25%. It is interesting to note that all states having a season ending by October 15, except Mississippi, have a resident adult population of approximately 10% breeding between September 1 and October 15. Unfortunately, there is no breakdown into half-month intervals. Data collected in Tennessee during 1947 and 1948 indicated a higher percentage of breeders taken by hunters during the period of September 16th through the 30th than were taken during the preceding 15 days. This may be explained by the fact that, during the first half of the month, by far the largest number of birds taken were juveniles, but, by midmonth, many of the birds of the year had moved out and left a larger proportionate adult population to be shot. The ratio of breeders in the adult population decreased, however, as the season progressed.

The low breeding population in Mississippi is difficult to explain unless large numbers of birds of the year, indistinguishable from adults, have migrated into Mississippi during late September. If these birds of the year make up a large part of the hunters' bags and they are classified as adults, a low adult breeding percentage would be noted. Random roadside counts indicate that large numbers of migratory doves pass through Mississippi during migration. (See Random Road Counts).

Figure III. Population trends based on percent of juveniles trapped.



The percentage of breeders may be misrepresented by sampling techniques and by the small number of birds handled. In Kentucky during a 1949 hunt, one sample of 27 birds revealed 19 adults and 19 breeders, whereas another sample of 300 birds indicated no adults.

AGING AND SEXING TECHNIQUES

Aging

Aging and sexing game animals are important factors in management. Previous methods of aging doves were devised by Pearson and Moore (1940) and, since it is so important, J. H. Jenkins, School of Forestry, University of Georgia, Athens, is undertaking a special study to determine methods of aging and sexing doves. Sixteen birds were obtained in 1949. These started 19 nests during 1950, from which 21 birds were raised. Periodical examinations of all known aged birds, coupled with data collected from wild birds, have given a fairly reliable index to the age of juveniles up to the time the last white-tipped juvenile covert (greater primary coverts) is lost. After the last white-tipped covert, as described by Pearson and Moore, has been replaced, no satisfactory method of determining adults from birds of the year has been found. Based on data collected to date, the moulting pattern listed below seems to be fairly constant. The primary feathers molt in an orderly manner, starting from the inside of the wing and progressing out to the tip. In nearly all cases, the feather is lost and replaced before the next primary is lost. It is noted by Jenkins that the replacement from 8 through 10 is slower than during early molts. The following intervals were noted in the primary molt pattern of birds under observation at Athens:

Feather number (Innermost primary is No. 1)	No. 1:	2:	3:	4:	5:	6:	7:	8:	9:	10:
Approximate age in days when lost	40:	45:	56:	68:	78:	90:	98:	115:	130:	150:

The season of fledgling apparently had little effect on the rate of molt. Unfortunately, the last juvenile covert is often lost at about the time the No. 8 primary is lost, and is usually gone by the time No. 9 is lost. This may be extremely important since many of the birds are at this stage during early fall hunting seasons.

Jenkins has this to say regarding the frayed edge of flight feathers:

> "Swank (Texas Game and Fish, February 1950) has stated that the frayed tips of the outer flight feathers of an adult can be distinguished from the unworn tips of the juvenile. I have modified this method somewhat and find that it can be fairly reliable in the Georgia area. I check the white fringe on the outermost curve of the tip of the primary, when only one or two old primaries are present. The white fringe at this point is usually present in juveniles and nearly absent in adults. If more than two primaries are present, the presence or absence of juvenile coverts is a much better criterion of age."

It is noted that these two methods appear to give more or less opposite results, which would indicate that they are not reliable.

Jenkins has this to say concerning other methods of aging doves:

> "Fusion of the ephiphyses and metocarpals is completed in about 40 days after hatching, therefore, it is worthless; the legs of young are paler pink but it is difficult to determine except on live birds and then under known aged conditions; the skull and third wing digit of juveniles seem to be somewhat different from adults but impractical to use in the field."

Sexing

Jenkins is working on methods of sexing birds and has this to say:

> "Petrides (1950) has stated that he accurately sexed 51 birds in adult plumage by color before dissection. I have repeated this on over 30 birds and found one error. The breast of the male has a rose pink shade, whereas, the female has a brown breast. It is best to make these comparisons under natural light. Both sexes show a gold iridescence on the sides of the neck in the summer, but the males have longer patches, often 40 m.m., or more, in length. Females seldom show a patch over 20 m.m. long and it is usually fainter."

We do not feel it advisable to attempt to sex doves under field conditions. However, each individual who is interested in the dove should watch for characteristics that may eventually lead to a practical method of doing so.

MORTALITY

The disease *Trichomonas gallinae* appeared in the Southeast during the past summer in epidemic form. Alabama seems to be hit hardest but this may be a mistaken assumption because the Alabama Conservation Department cooperating with the Cooperative Wildlife Research Unit put into operation excellent machinery for reporting diseases and mortality. Because of the complete coverage, more diseased or dead birds were naturally reported. The disease has been quite prevalent in Alabama and numerous reports have been sent in by all states in the Southeast.

It is too early to determine the effect of this disease on the dove population or on the hunting success. One interesting fact has been reported from those states in the Southeast that hunted during September. With the exception of Kentucky, the percentage of juveniles taken by hunters during the early season is lower than during the same period last year.

It is impossible to tell what part, if any, *Trichomonas* has in this low juvenile ratio, because other factors may be responsible. It is feasible that the warm winter and early spring were conducive to earlier breeding and birds from early hatches had obtained adult plumage by September. *Trichomonas* may have interferred only with late nesting whereas spring and early summer hatches may have been normal. Fall adult-juvenile ratios will continue to be collected

Hunting success during the first half of the split season was about average. The kill per gun hour in most states was less than last year. Therefore, it may be stated that the dove population is slightly less than at the same time last year. It is too early to state the full significance of the low adult-juvenile ratio or the reduced kill per hour. The midwinter inventory to be held during late January and early February should give a true picture of the dove population and whether or not there is an overall reduction.

The following information concerning dove mortality in Alabama, as reported by Dr. Arnold O. Haugen, Leader, is taken from the October, November, and December 1950 Quarterly Report of the Alabama Cooperative Wildlife Research Unit:

"On the basis of reports from game wardens, sportsmen, biologists, county agents, and Soil Conservation Service employees, mortality of mourning doves in 1950 occurred in 40 of Alabama's 67 counties. The earliest deaths were reported in January while June, July and August marked the peak of the die-off. The latest mortality was reported from Coffee County in December.

"Information received from county agents and Soil Conservation Service employees since the opening of the dove season in December gives the following estimates on current population:

	More doves	Same number	Fewer
County Agents:	7	6	10
Soil Conservation Employees:	3	11	17

"Reports indicate the mortality ranged from a few individuals to as many as an estimated 4000 in Lamar County. One man in Fayette County indicated he believed all doves died. Obviously this report is too pessimistic.

"Even though some localities appear to have as many doves as ever, there is little doubt that the die-off was serious and has resulted in a reduced state population. Indications are that the population is spotty. A few localities are reported to have suffered a die-off in 1948 and 1949.

"No information is available on the progress of the die-off from trichomoniasis in other states of the southeast since last summer.

"The dove population at the Piedmont Substation has decreased considerably in the past year. This is obvious from both general observation and hunting activity on the area.

"Comparative data on Dove Hunting at the Piedmont Substation

Table 3.

	December 1949						December 1950			
	23	24	27	28	29	Total	18	23	30	Total
No. men hunting	4	10	5	4	5	28	3	1	2	6
No. gun hours	16	30	15	10½	15	86½	7	2	2	11
No. doves harvested	37	75	14	9	12	147	3	0	2	5
Gun hours per dove						.59				2.2

Because of the scarcity of doves on the station area, only six hunters have requested permission to hunt on the area in 1950.

"A total of 28 doves shot since the season opened have been examined for signs of trichomoniasis. A smear from the throat of each dove was microscopically examined but no trichomonads were found."

MISCELLANEOUS

Publicity

St. Clair Thompson, Leader of the Mourning Dove Project in Mississippi, was chosen as senior author of the paper to be presented at the North American Wildlife Conference in Milwaukee. The paper is entitled, The Southeastern Cooperative Dove Study and will give the history of the study, its objectives, plan of approach and a brief progress report.

Marking Doves

One hundred fifty-seven doves, which were trapped during September and October in the vicinity of Apalachicola, were dyed a bright orange by Frank Winston, Leader of the Mourning Dove Project in Florida. This section of Florida is thought to be a dove concentration point preceding a mass movement either across the Gulf of Mexico or down the west coast of Florida to the southern tip of the state. Considerable publicity on the "flying oranges" was given throughout the state. Several birds were seen or killed in south Florid during October. All states north of Florida should be on the lookout for bird that are bright yellow.

During November, Frank dyed a number of birds bright red and called them "flying strawberries". These birds were trapped in south Florida and will be given publicity to determine if they show up in the hunters' bags during the late December and January season in the northern part of the state. Those ste immediately north of Florida should be on the watch for birds that are red.

SPECIAL STUDIES

Through the cooperation of the Biology Department of the University of Georgia and the Zoology Department of the University of Tennessee, special studies to determine the value and significance of cooing counts will be made during the forthcoming breeding period. They will attempt to determine the value of coo counts as a yardstick for measuring breeding populations on given areas. This study will also determine the best time of day for taking a coo count and under what conditions.

BANDING

As of December 31, 1950, 22,301 doves have been banded in the ten Southeastern States cooperating in this study. This is about two-thirds the number banded during the preceding 28 years.

A STATISTICAL SUMMARY OF THE 1950 MOURNING DOVE WINTER INVENTORY

Leonard E. Foote
Wildlife Management Institute
January 1951

Introduction

The usefulness of population indices taken at periodic intervals is well established as a tool of wildlife management. Until February, 1950, no large scale effort had been made to obtain a winter population index of mourning dove abundance, although road counts, cooing counts, and other population indices have been used in different seasons in a number of states. (c.f. Ginn 1950; Siegler and Newman, 1944; McClure, 1939; and others).

Within the framework of the Cooperative Dove Study it has appeared desirable to develop and to test coordinated methods of obtaining annual population indices derived from five sources of data:

1. Winter population inventory
2. Spring and summer breeding population inventory
3. Midsummer production inventory
4. Hunter bag age-ratio counts
5. Band analysis

This report constitutes a summary of statistical tests of several winter population inventory methods tried in the Southeastern states during February 1950. The keynote has been cooperation; all data were gathered under the direction and supervision of state dove project leaders. Without their ready cooperation, initiative, and leadership a region-wide effort of this type would be impossible. Harold S. Peters, George Moore, and the writer planned the census with suggestions from Edward Wellein and Walter Crissey of the U. S. Fish and Wildlife Service. We are indebted to Dr. A. C. Cohen Mathematics Department, University of Georgia, Athens, for suggestions on statistical procedures to follow in the analysis, and to Dr. Broadus Browne, University of Georgia, for reviewing the report. Mrs. Jewell Key and Mrs. Cle Morris of the U. S. Fish and Wildlife Service performed many of the tedious computations. Grace C. Foote typed the manuscript and assisted in preparing the tables and graphs.

We are indebted to many state federal aid employees, law enforcement officers and several thousand rural mail carriers who voluntarily assiste in the counts.

Objectives

The purpose of the entire winter census was to test different metho of appraising wintering dove populations in the southeast in order to obtain index which could be used annually to compare wintering dove populations in t area. In addition to the requirement that the census method accurately refle annual population trends an inventory of this kind must be economical and statistically sound. Further, any method must furnish results which can be anal and evaluated with a minimum of effort, and one which, at the cessation of the coordinated dove projects, can be carried on with a minimum of supervision from state and federal wildlife administrators.

The purpose of this summary is to report on the analyses of the four major types of censuses tried, to evaluate each method statistically and to compare the results. The evaluation of the several winter census methods involves biological and statistical analyses which are separate and distinct problems. Only the biologist can decide whether the methods used reflect or represent true dove population levels and the statistician can only determine which of the methods yields the least variation due to chance or other factors which may affect the sampling. (c. f. Thompson & Adams, 1950)

Description of Census Methods

The general procedure consisted of dividing each of the cooperating states into major ecological types and running proportionate samples of different types of roadside and plot counts in each major ecological type. In the absence of any previously-gathered data on dove abundance throughout the southeast, the region was divided into major ecological types to see if any significant differences could be found in dove populations in different major soil, vegetation, and land use,-- ecological -- types. Most states in the southeast have previously been mapped by land management agencies and different major land types have been designated. It is interesting to note that, although different land management agencies had classified the major types in each of the states, little adjustment would be required to present a summary by major types rather than by states so harmoniously did the types join for a regional picture.

Four census methods were tested:

1. Biologist Plot Count

Plots 160 acres in size were pre-selected at random by the state dove project leader and were numbered on county road maps, to be approximately twenty-five road miles apart, and with no selection as to cover types or other factors. An effort was made to sample at least one-tenth of one per cent of the total land area in each state, but no plot was covered more than once. Two biologists examined each area and attempted to flush and count all doves on the area. Because of the large number of samples thought to be needed for reliability, each crew of two biologists was to examine four plots a day each day for five days and drive a minimum of 100 miles on a roadside count each day (method 2) as well. Plots were hastily covered, and hastily mapped. In some instances crews were made up of a biologist and a selected conservation officer. Table 1.

2. Biologist Road Counts

Each pair of biologists conducted four counts of mourning doves seen along different roadsides each day during the five days of the census while driving to plots designated under method 1. Roadside count routes were pre-selected from county road maps at random by the state dove project leader and each transect was approximately 25 miles long, mainly on secondary roads. Speeds were standardized at 25-30 miles per hour and this was generally adhered to, except when bad roads were encountered. All doves seen in flight or on the ground or perched were recorded. Although the first 25-mile transect was nearly always begun at sunrise and two transects were usually run before noon, the time to start each transect was not standardized because of the varying amount of time required to examine

Table 1. Plot and Roadside Count Form Used By Biologists In 8 Southeastern States, February 6 - 10, 1950

DOVE CENSUS

Use a separate page for each plot and section of road count.

Date ______________________ County ________________ Area No. ______

Observer ____

ROAD COUNT

Speedometer reading at each dove sited	Number of doves seen	Time	Cover or Type of Land Use

Time start ______________________. Time end ______________

Total miles driven ________________. Total number of doves seen ______

SAMPLING AREA

Time start ______________ Time end ______________ No. doves seen ______

Brief description of area, including land use and rough diagram ______ each sample plot. In general a proportionate number of biologist road counts were made in each major type in each state. Table 1.

3. Warden Roadside Counts

In North Carolina each county conservation officer established a fifteen-mile roadside transect on which he recorded all doves seen on three runs on this route. Censuses were made during the week of February 6-10, 1950, only on days of good weather. All officers were asked to start their routes at 8:00 A. M. and to drive at speeds of from 15-20 miles per hour. All routes were on secondary roads and doves were recorded as seen. Table 2.

4. Rural Mail Carrier Counts

In six states rural mail carriers were asked to record all doves seen along their routes on each of the five days from February 6-10, 1950, after prior approval had been obtained to ask their voluntary help. They were asked to record certain weather data, the length of their route, and the time route was started and the time the route was completed. Forms were returned to the respective state conservation departments by the carriers and sorted by the state project leader into appropriate major ecological types by counties. Common averages were computed for each type and for each state as a whole. Table 3.

Analysis Procedures

The four types of censuses were all conducted during the same weekly period, and,except for the North Carolina Warden Road transects, were organized to provide for an analysis of each method by itself, and for a series of comparisons among data gathered by each method either on state, groups of states, or major ecological type boundaries. Furthermore, in two censuses, (Biologist Road Count and Warden Road Counts) all data were gathered in "raw" form, no addition or other calculations being employed on the field data sheets. This was expressly provided in biologist road counts in order to permit an evaluation of some of the underlying reasons for the common type of curve which was found to result from all census methods tested.

The analysis procedures are standard statistical methods and an explanation of their deriviation, usefulness, and meaning can be found in any statistical text. (c.f. Waugh, 1943, Snedecor, 1937).

As a measure of central tendency, the arithmatic ($\bar{X}$) is used, the standard deviation (σ) expresses the dispersion of the items about the mean, the standard error of the mean (σm) expresses dispersion of means of similar samples, the coefficient of variation (V) expresses relative (not absolute) variation of samples, and the coefficient of simple linear correlation (r), is used to express correlation. A test of the average range ($\bar{R}$) was used to determine uniformity on the two types of data having repeated censuses over the same transects (Warden Roadside Counts and Rural Mail Carriers' Road Counts).

As will be noted, frequency curves of data from each of the four types of censuses are strongly reverse "J" shaped and, in fact, approach the characteristics of a Poisson distribution. It is evident that the statistical "p" for these data is small. Application of the arithmatic mean and standard deviation as descriptive measures of strongly skewed distributions can only be used with an under-

Table 2. North Carolina Warden Roadside Count Report Form

ROAD COUNT

County Avery

Date Feb. 7, 1950

Protector W. M. Carpenter

Was help used? No

Time started 8:00 A. M.

Time ended 10:05 A. M.

Weather: Cloudy Yes

Clear

Number of Doves Seen	Where Seen (flying, wires, type of field, etc.)
0	

Total

Remarks:

Table 3. Rural Mail Carrier Report Form Used In Six Southeastern States

RURAL MAIL CARRIER DOVE INVENTORY FORM

1950

Date - February	6th	7th	8th	9th	10th
Number of doves seen					
Temperature at end of trip					
Sky clear					
Sky cloudy					
Sky partly cloudy					
No rain					
Drizzle					
Showers					
Heavy rain					
Snow					
No wind					
Light wind					
Heavy wind					

Remarks:

Number of miles on route ____________. Time you start on route ____________

Time you complete route ____________. County route located in ____________

This report submitted by ______________________________

Mail to (Name of State Game Department)

Address ______________________________

standing of the shape of the distribution, and consequently, the limitations in the meaning of these measures as they may be applied.

Snedecor (1937, p. 51) says, "As an estimate of the variability of means, the standard error is not noticeably affected by even pronounced skewness in the experimental material. Means tend to be normally distributed despite a considerable departure of the population from normality. For this reason, the standard error is often a more reliable description of the variation of the means than is the standard deviation of the variation of the items in a sample. Samples drawn from a non-normal population are likely to have distributions poorly described by either X or s." (average or standard deviation).

Three times the standard error of the mean ($3\sigma m$) is used in this report to denote significance. Within three standard errors of the mean will occur 99.7% of the means of similar samples; any increase or decrease in the sample mean of three times its standard error would occur by chance only three times out of 1,000. In statistical practice this is judged "significant". (c.f. Waugh, 1943). Because of the pronounced skewness in the distribution o data on wintering dove populations, caution must be exercised in using any i dex derived from this data, at least until more information is available.

An ideal index is one which will give good results in both low and high population densities and one which can be applied under different conditions encountered in the field. All four of the censuses tested can be applied with minor modifications almost anywhere in the southeast. Because of the striking resemblances of curves of the frequencies of all data collected, in some instances only data from one to several states rather than all data collected, have been analyzed. Inspection of other data indicates that it would yield similar patterns when plotted.

Result of Censuses

1. Biologist Plot Count

Table 4 compares results from plot counts with biologists' road counts and rural mail carrier road counts as summarized by Harold S. Peters from data reported in quarterly reports by project leaders. Biologists in eight states tested the plot count method and it is evident that results from the plot counts as expressed by the arithmetic means of these samples show little relationship to other data in Table 4.

Difficulty was experienced not only in covering each plot effectively in the short time allotted, but also in judging the size of a 160-acre plot in the field. Plot counts yielded extremely variable and unreliable data, in part at least, because of the inherent difficulty of using the method in the field and the relatively small sample which could be taken wit the available, trained manpower.

Data from the 195 plots examined by biologists in Alabama were tested statistically. Data were first arranged in a frequency table, and appear in Graph 1. Many of the plots examined contained no doves leading to the suspicion that in areas of very low dove abundance an exceedingly large number of plots would have to be examined to obtain figures which could be used statistically.

Table 4. Comparison Of Plot And Road Counts By States
Taken From Quarterly Reports Of Projects

Number of Sample Plots (160 acres each)	Doves per 100 Acres	Biologists' Road Count			Rural Mail Carriers' Count		
		Miles	Doves	Doves p/100 mi.	Miles	Doves	Doves p/100 mi.
195	4.3	5,538	2,553	46.1	153,954	38,037	24.7
111	1.7	2,550	276	10.8			
20	17.5	1,660	79	4.7	65,620	7,745	11.8
202	3.6	6,169	1,896	30.7	233,652	28,690	12.3
206	4.5	7,663		46.9			30.1*
140	6.1	4,900	1,347	27.7	30,975	4,780	15.4
200	8.7	5,291	2,370	44.8	142,444	25,753	18.1
174	5.1	6,219	3,924	63.1	203,586	34,330	16.8

---

dens' Count

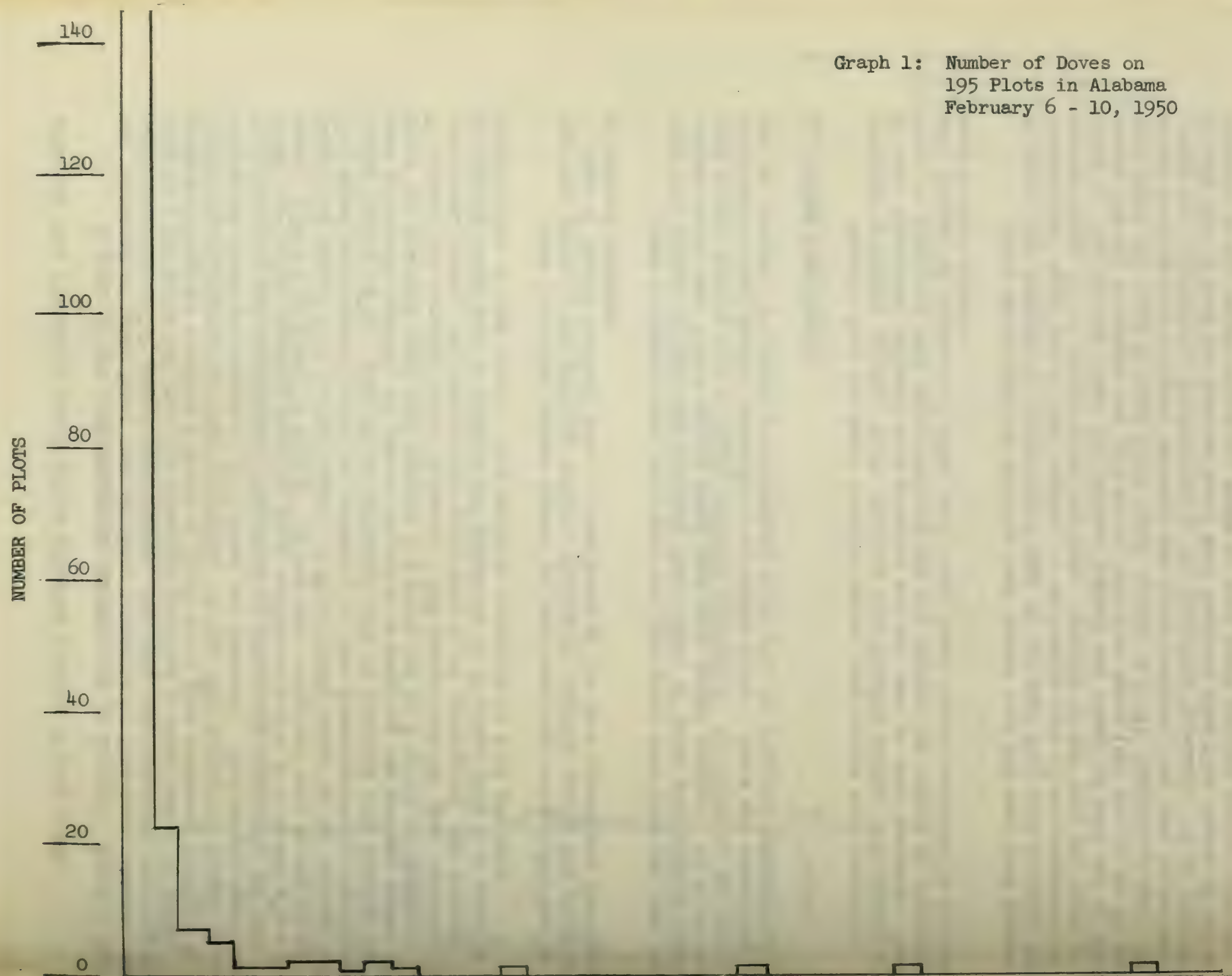
Comparison with data from plots run in eastern Kentucky bears this out. Populations here are evidently low because a team of biologists examined the standard number of plots during the week of February 6-10 without reportin any doves, although a small number of doves were seen by these same biologists on road counts in the same section of the state. The twelve plots examined by Louisiana biologists in the Prairie region contained no doves, but a small num ber were observed on roadside counts in the same region. Plot samples, therefore, seemed to be a poor index of dove abundance where the population was low unless a very large number of plots could be examined.

Examination of Graph 1 indicates a strongly skewed reverse "J" shape distribution with many plots containing from zero to a few doves and very few plots containing high numbers of doves. Plots in Alabama averaged 8.4 doves per 160-acre plot, when each plot is given the weight on one. (Note that this is a weighted average, while results shown in Table 4 are non-weighted, or com mon averages). Other statistics from this sample are $\sigma = 23.3$ doves, $\sigma m = 1.6$ doves, $3\sigma m = 5.01$ doves, V = 277%. From these data the conclusion may be dra that the means or averages of similar sized samples having the same dispersio would, due to chance variations in the sampling, vary from 3.4 to 13.4 doves per plot. To express this another way, we would be sure we had a real change (using $3\sigma m = 99.7\%$ of cases) in the doves observed on 195 Alabama 160-acre pl only when the average or mean increased or decreased by 59.6% of its present value. And an examination of 780 plots in the same way and having the same di- persion of numbers of doves on individual plots would allow the denotation of only a change of greater than 30% of the average number of doves observed. With 780 similar plots, a change of less than 30% might be due to sampling. To dene a 15% change, 3120 plots; a 7-1/2% change, 12,480 plots would be necessary. This is 3,120 square miles, or about six per cent of the total land area of Alabam an impossible number to census with the manpower now available.

An examination of results of plot counts from other states (Georgia, Kentucky, Louisiana) showed similar dispersions, indicating that extremely large samples would be required to ascribe any reasonable accuracy to means of samples so gathered. It is evident, therefore, that plot counts are economically and statistically unsound as an indicator of winter dove populations because extremely large samales would be required to get dependable averages not easily influenced by sampling. This would be especially true in areas of low population. Plot count data from the censuses of February 6-10 cannot be projecte reliably to yield statewide dove population figures. (Projecting a little our- selves, we could say that from this sample of 195 plots, the dove population in Alabama might be somewhere between 692,600 and 2,733,600 birds if biologis counted all the doves on plots, if plots were really randomly selected, etc.)

2. Biologist Road Counts

Biologist road counts were conducted in eight states using Pittman-Robertson personnel and selected conservation officers. Each crew of two men ran four 25-mile transects each day during the week of February 6-10, 1950. moderate amount of difficulty was encountered in following the pre-selected routes because of changes in roads from old maps and because rains in some parts of the region made roads impassable. The first 25-mile transect was to be start- ed at sunrise but no time was standardized for other transects during the day A proportionate number of transects was examined in each major ecological type in the state and an attempt was made to standardize the speed at 25-30 miles per hou



Graph 1: Number of Doves on
195 Plots in Alabama
February 6 - 10, 1950

although this frequently could not be followed because of poor roads.

A total of 202 such transects was examined in Alabama. Graph 2 sho the frequency of total doves seen on these transects by five dove classes. N again the reverse "J" shaped distribution, but with many transects yielding f zero to a few doves and very few transects yielding a large number of birds. Alabama biologists traveled a total of 5,538 miles (the transects averaged 27. miles) counting doves on these transects. Giving each transect a weight of o biologists found an average of 13.8 doves per transect. This sample again sh high variation and considerable dispersion of individual items from the mean. Other statistics computed describe these sufficiently: σ = 38.0 doves, σ_m = 2. doves, $3\sigma_m$ = 8.01 doves, V = 275%. If the same transects were re-run in the manner and varied in a similar manner, a 58 per cent change in the average (o 13.8 doves per transect) would be necessary to have a statistically significa change (using $3\sigma_m$). Thus if the transects were re-examined with exactly the same population present, by chance variation in sampling the average number o doves per transect might fall between 5.8 doves and 21.8 doves per transect. To reduce this sampling error to denote a 29% change with the same variation individual counts, the sample size would have to be quadrupled, and Alabama biologists would have to examine 808 transects of 25 miles each -- a total of 22,200 miles of road count. This would be expensive at $.07 per mile.

Data from other states showed the same sampling variability, but as has been noted in the previous section, biologist roadside counts did yield da -- even if highly variable data -- from areas of low dove population level su as eastern Kentucky.

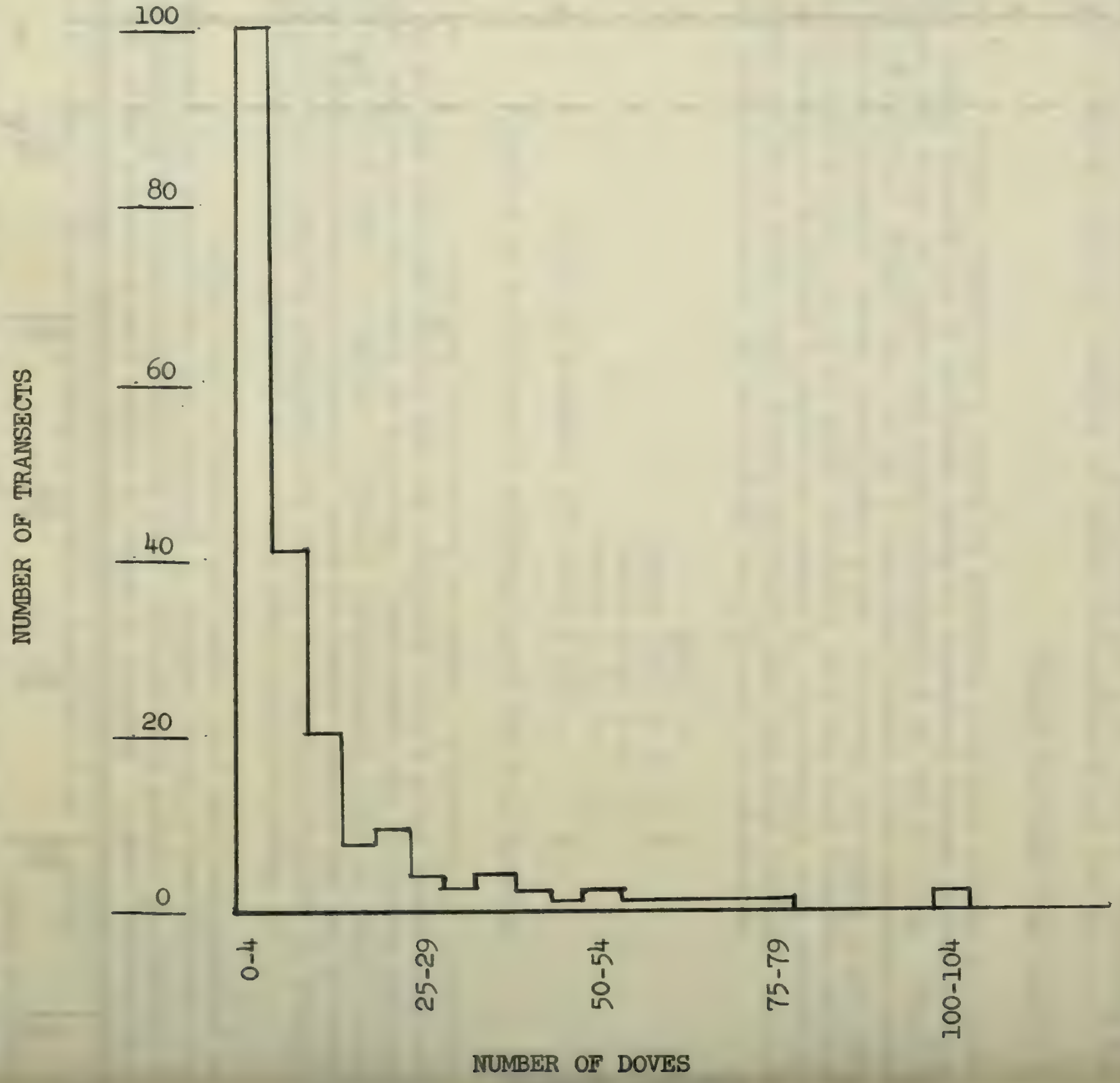
Thus biologist road count data and plot count data from the same are both were highly variable and averages from either of these two types of popul indices would mean little unless based upon much larger samples. It is evide that we are dealing with a highly variable population, one which is far from e distributed along sample transects or on sample plots. There are underlying for the reverse "J" shaped distributions which will be explored subsequently.

3. Warden Road Counts

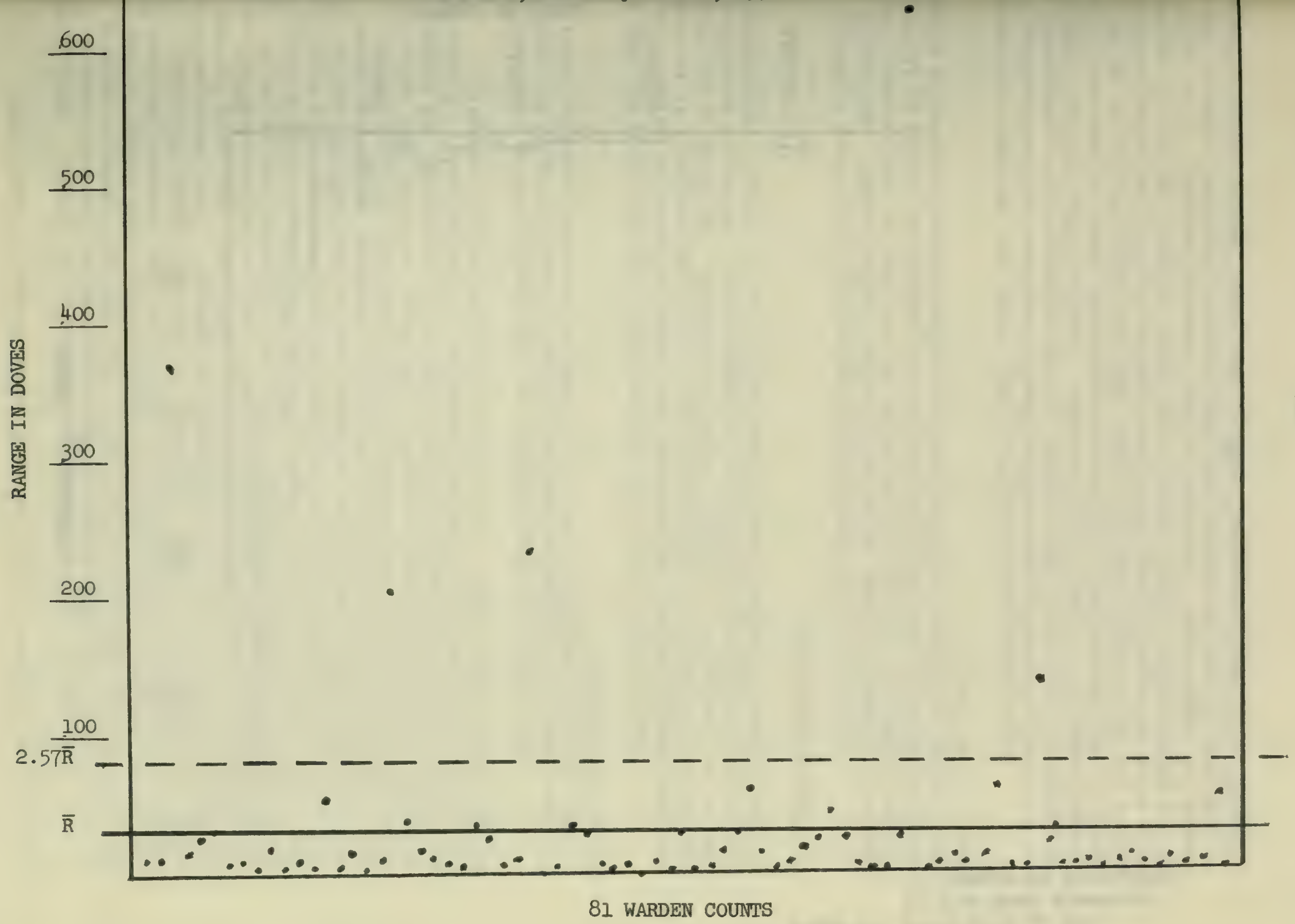
Results from the North Carolina warden road counts were carefully examined by Donald Allison, North Carolina Dove Project Leader, and reports o 81 most dependable officers were selected and are used in this analysis. Sin there is suspicion that other officers did not conduct the census as directed, part because of pressure of other work, only those reports selected by Alliso used in this summary.

Since North Carolina officers made counts over the same road transe on three (not necessarily consecutive) days at the same hour each morning, un standardized speed and in fair weather, a uniformity test of an examination o average range ($\bar{R}$) of counts first was made. Results of the test are shown in Graph 3. The average range (R) between highest and lowest of each set of thes counts for all 81 counts was 31.9 doves, and five cases (6%) out of the 81 co were above the upper $\bar{R}$ limit (with three counts, 2.57 $\bar{R}$), indicating again th we are dealing with a highly variable and fluid resource, one that is neither evenly nor consistently distributed on the transects censused. It is interes to note that $\bar{R}$ test for Alabama Rural Mail Carriers from five counts of the s transect in all major ecological zones in that state yielded similar results.

Graph 2: Doves Seen on 202
25-Mile Road Transects
In Alabama By Biologists



Wardens, February 6 - 10, 1950



Using $\bar{R}$ as a measure of uniformity, not more than one per cent of the cases should fall outside of 2.57 $\bar{R}$. (between 0 doves and 82.2 doves for North Carolina data)

Graph 4 is a frequency polygon of data from the 81 censuses by North Carolina wardens. A similarity in pattern will be seen when this is compared with Graphs 1 and 2. Numbers of doves on warden road transects again fall into a reverse "J" shaped distribution, with many observations of a few doves and few observations of large numbers of doves in the same pattern of distribution as was obtained from plot counts and biologist road counts.

In comparison with other data, it is probable that North Carolina wardens in general selected the better dove habitats for their transects because of the far greater number of doves reported on a doves-per-hundred miles basis, (than in other southeastern states), although no other North Carolina data are available for comparison. Selection of transects in the best habitat available would yield a bias sampling, and the better habitats may not be as indicative of population changes as are marginal habitats.

Results from the North Carolina transects are as follows:

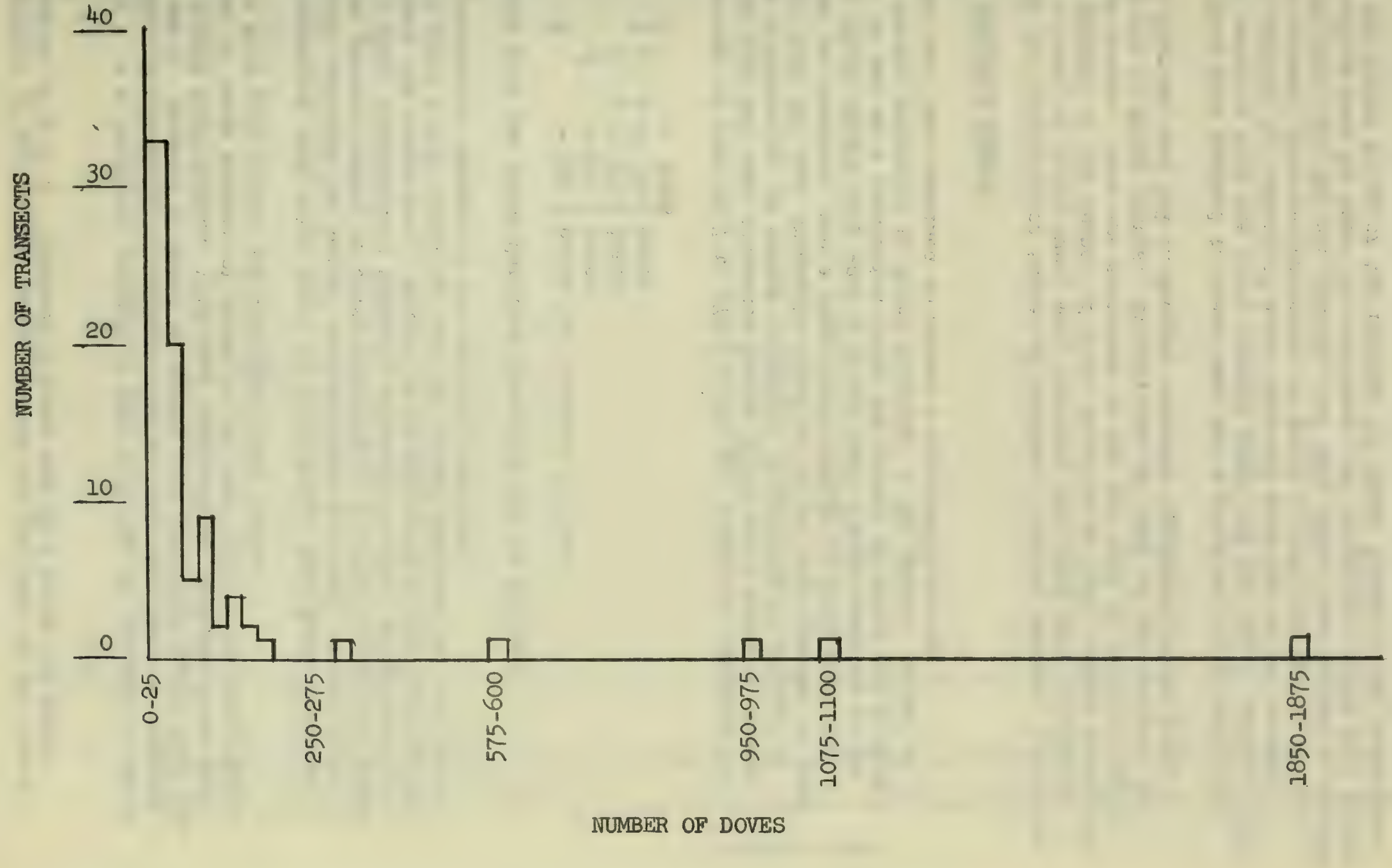
$\bar{X}$ = 100.3 doves per transect (3 runs)
σ = 217.5 doves
σ_m = 24.2 doves
$3\sigma_m$ = 72.6 doves
V = 216%

An average of from 27.7 to 172.9 doves per three-run transect for similar censuses over the same transects (using $3\sigma_m$) could occur by chance. To express this differently, by chance variation in sampling an average of similar censuses over the same transects could be 72 per cent greater or less than 100.3 doves per transect, and a significant change in doves observed on these transects would result only when a 72 per cent change occurred in the average. Thus, to use as a population index the number of doves per hundred miles found on warden transects in North Carolina, a far greater number of transects should have been examined to secure a dependable average.

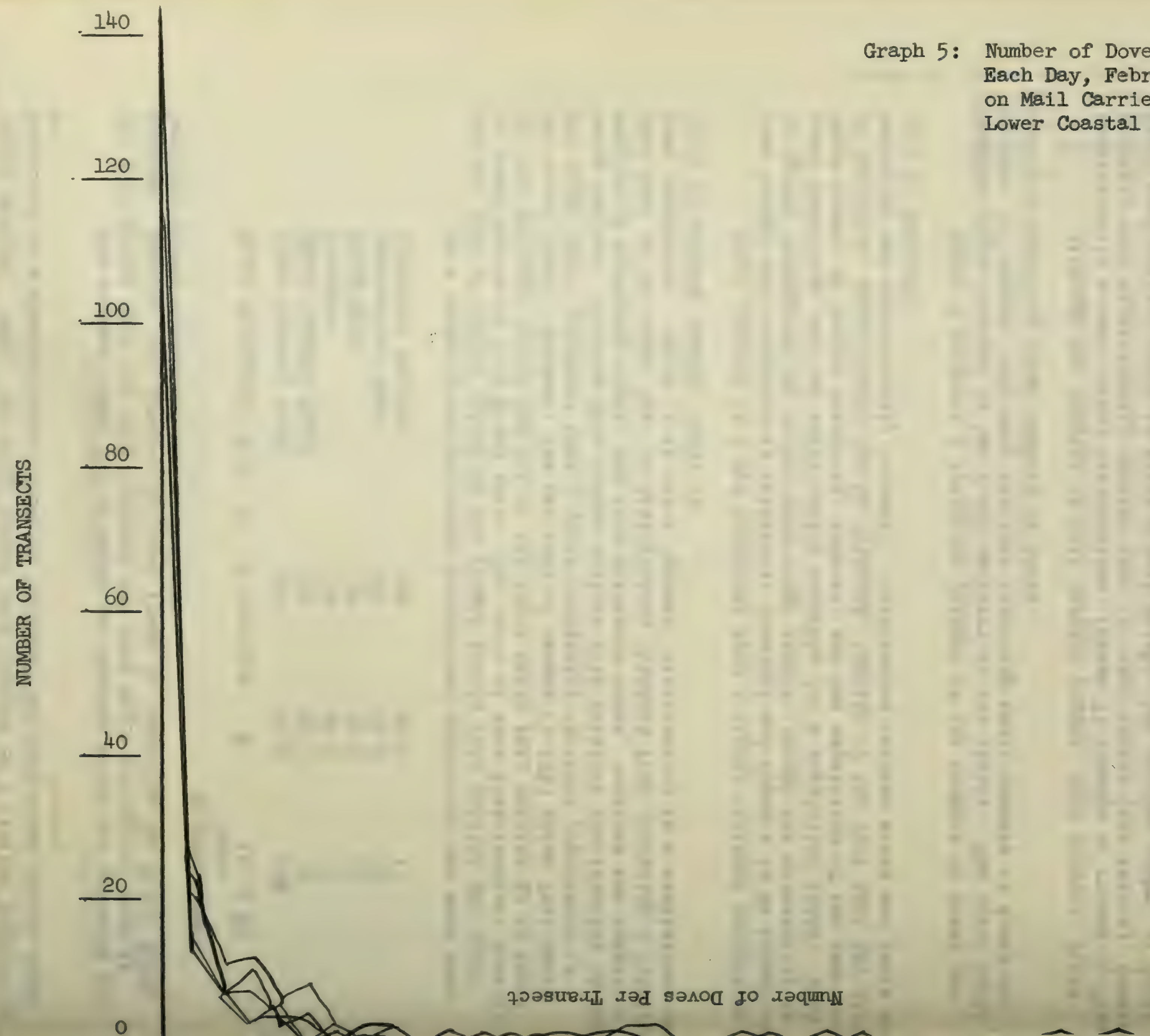
4. Rural Mail Carriers Census

In the six southeastern states of Alabama, Florida, Georgia, Louisiana and Tennessee, a total of 2,923 rural mail carriers furnished data considered usable in this summary on the number of doves observed on their routes during the five days of the census. Data are available on the per cent of carriers who returned usable forms in three states. Seventy-one per cent of the carriers in Alabama, 77% in Florida, and 74% in Georgia returned completed census forms.

The first test applied to these data was a graphical test: data furnished by rural carriers from the lower coastal plain and the upper coastal plain in Alabama were plotted by numbers of doves observed each day of the census. Graph 5. It is evident, from an inspection of Graph 5, that the curves of frequencies of doves seen each day are similar, and that while some variation existed in daily observations made by those 160 carriers, the frequency curves held to the same type, all the curves being of the reverse "J" shape found in the three other



Graph 4: Number of Doves on 3 Counts on 15-mile Transects by North Carolina Conservation Officers, February 6-10, 1950



Graph 5: Number of Doves Observed Each Day, February 6-10, 1950 on Mail Carrier Routes in the Lower Coastal Plain, Alabama

census methods. Thus, the daily counts were samples of a similar population dispersed in a similar manner, however variable the individual counts might be.

The average range ($\bar{R}$) in doves per hundred miles per transect for the five census days was then computed for each major ecological type in Alabama. Results were similar to those found in computing the $\bar{R}$ for North Carolina warden census and are as follows:

Major Ecological Type	No. of Carriers	$\bar{R}$	% above upper limit (2.11 $\bar{R}$)
Lower Coastal Plain	160	23.8	15%
Upper Coastal Plain	100	40.6	9
Piedmont	54	34.2	13
Black Belt	39	59.2	13
Appalachian Mtns.	120	61.8	15
Limestone Valleys	109	56.7	13

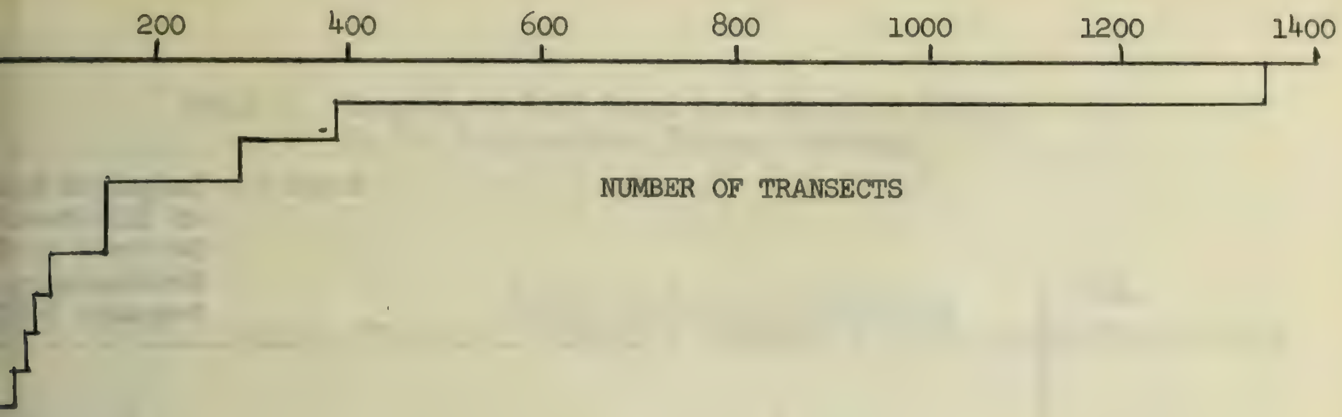
In a normally and uniformly distributed population not more than one per cent of sample values of the ranges should fall outside the upper or lower limits of 2.11 $\bar{R}$ and zero. The curve of this distribution, however, is very strongly skewed and all of the cases which fall outside do so above the upper limit. Further, the per cent of ranges (9-15%) which fall above the upper limit indicates that a quite constantly variable population is being sampled. Finding this common pattern with relative consistently throug samples of different types, and from different areas, confirms the suspicion that this is the usual type of distribution obtained from censusing a winteri dove population. While it is not a "normal" distribution in a statistical se there is nothing unusual about it.

Small samples of a few transects from a highly variable population, even though this variation is relatively constant and appears to be homogeneo ly spread throughout the winter dove range sample, though not necessarily in equal densities, are not sufficiently accurate for a population index. With large number of sample transects, however, and the repetition of the same pat of variation, significance can be obtained, inspite of the fact that the dist bution is not statistically "normal". Differences between areas and years ca then be analyzed.

Graph 6 presents a frequency polygon of the numbers of doves per hundred miles reported by the 2,923 carriers in six states. The curve again reverse "J" shaped, with many carriers reporting small numbers of doves and f carriers reporting large numbers of doves.

Although the lengths of mail carrier routes, when plotted, yield statistically a near-normal distribution, (Graph 7) lengths of routes in Tenne probably were significantly shorter than in other states (not tested). (Table Since each carrier route is given a unit weight, the average number of doves hundred miles will differ from the common averages reported by project leader It is important, because of the conversion of individual reports to a doves-p hundred-miles basis, to know that lengths of mail carrier routes in the six s sampled approached a normal distribution.

Table 6 presents a summary of statistics compiled by major ecologic types by states and permits comparison of results. A statistically significa difference was found between the average number of doves per hundred miles in Alabama and in Florida, and for most of the state censuses it will be possibl



Graph 6: Doves Per Hundred Miles Reported on Transects by 2923 Rural Mail Carriers in Six Southeastern States February 6 - 10, 1950

Graph 7: Length of Rou
of 3118 Rural
Carriers in S
Southeastern
February 6-10

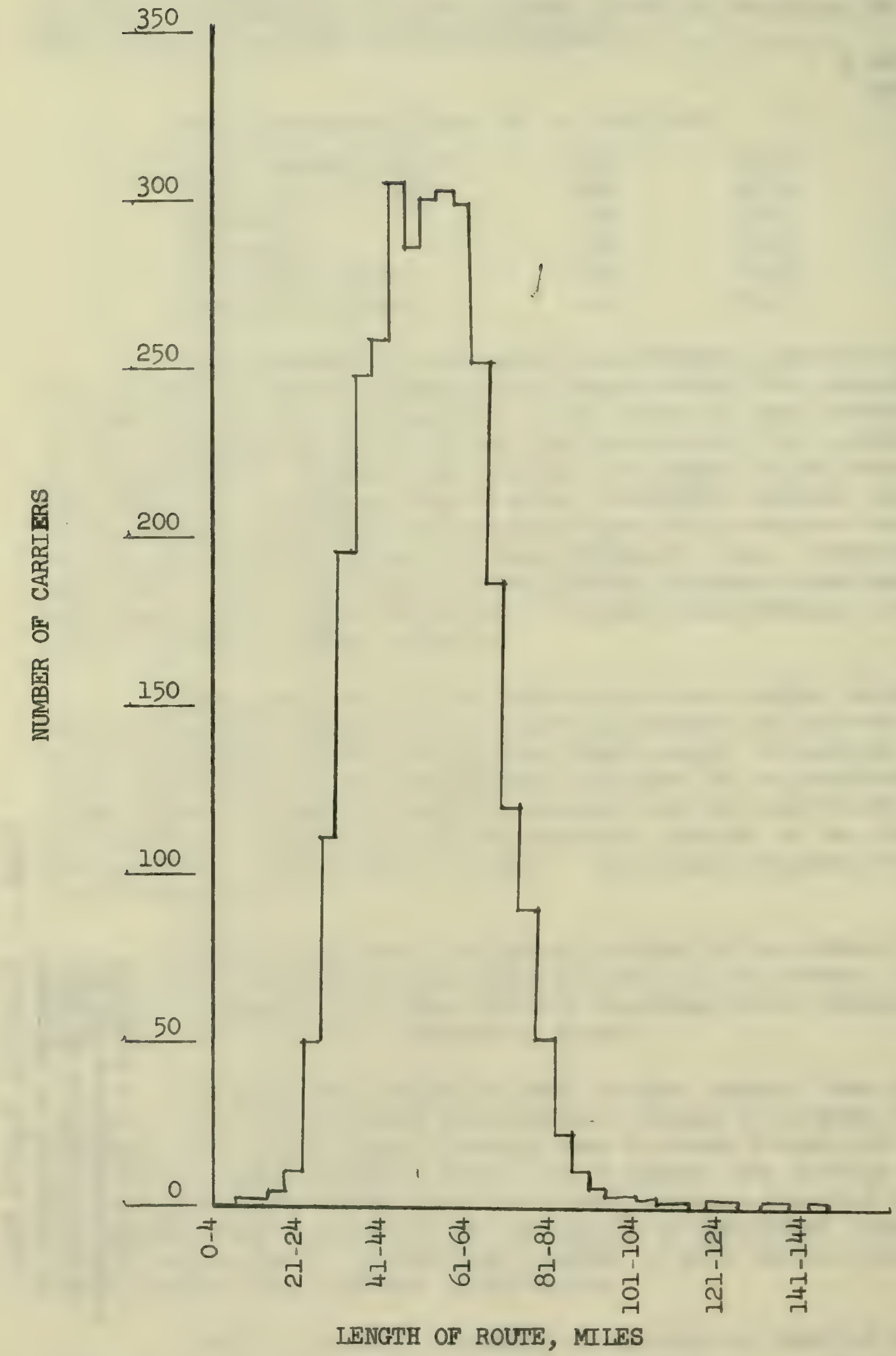


Table 5. Lengths of 3118 Rural Mail Carriers Routes
In Six Southeastern States, February, 1950

ength of	Number of Carriers Reporting						
oute, Miles	Alabama	Tennessee	Louisiana	Georgia	Florida	Mississippi	Total
1 - 4							
5 - 8				1			1
9 - 12			1				1
13 - 16	2			1			3
17 - 20	3	3	1	5			12
21 - 24	5	28		6	5	5	49
25 - 28	13	59	6	10	9	14	111
29 - 32	21	116	3	19	9	28	196
33 - 36	35	133	8	27	13	32	248
37 - 40	58	104	10	29	18	40	259
41 - 44	57	131	12	38	22	45	305
45 - 48	57	94	13	61	13	47	285
49 - 52	65	85	13	70	20	47	300
53 - 56	64	72	10	78	18	59	301
57 - 60	74	60	11	78	22	52	297
61 - 64	45	37	9	75	28	58	252
65 - 68	44	14	3	60	22	43	186
69 - 72	26	9	10	37	11	25	118
73 - 76	18	2	6	34	9	20	89
77 - 80	7	1	2	19	8	13	50
81 - 84	2			8	3	9	22
85 - 88	2	1	1	2	4	1	11
89 - 92	1	1		2		2	6
93 - 96	1			2			3
97 - 100				3			3
101 - 104				2			2
105 - 108					1		1
109 - 112				1			1
113 - 116							
117 - 120					2		2
121 - 124				1			1
125 - 128							
129 - 132				1			1
133 - 136					1		1
137 - 140							
141 - 144				1			1
otals	600	950	119	671	238	540	3118

Table 6. Summary of Statistics Computed from Rural Mail Carriers Roadside Dove Counts, by Major Ecological Types by States

	$\bar{X}$ Average No. Doves/100 miles	σ Doves/100 miles	Number Carriers	σ_m Doves/100 miles	V	% Change for sig cance
Region	16.95	29.3	2923	0.542	173%	9.
Georgia						
State	17.0	29.5	561	1.24	165%	21.
Upper Coastal	11.3	23.5	183	1.74		
Piedmont	22.3	34.0	249	2.15		
Lower Coastal	8.0	11.5	65	1.43		
Limestone	18.3	21.0	46	3.04		
Tennessee						
State	17.75	30.0	935	0.98	169%	16.
W. Tenn. Plains	17.4	20.5	234	1.34		
Highland R.	18.1	27.0	209	1.86		
Central Basin	15.3	26.0	150	2.13		
Cumberland Mts.	13.2	24.0	69	3.00		
Unaka Mt. Range	8.5	13.0	97	1.31		
Florida						
State	14.1	24.5	228	1.62	176%	34.
Alabama						
State	21.43	35.2	575	1.46	169%	20.
Lower Coastal	11.3	28.5	160	2.24		
Piedmont	16.3	24.5	53	3.27		
Upper Coastal	21.0	29.5	95	3.01		
Appalachian Mts.	30.9	43.5	120	3.95		
Limestone Vals.	27.3	36.0	109	3.46		
Louisiana						
State	17.6	35.3	110	3.36	200%	56.
Mississippi						
State	18.0	23.0	515	1.01	138%	16.
Upl. Hwds.	12.9	17.0	127	1.50		
Pine Hwds.	20.9	27.5	253	1.73		

o denote as significant a 20% change in the average number of doves seen by ail carriers. Because of the large number of transects run in the region and not considering at present the weighting of the state subsamples which hould be done for the 1951 census) it is possible to denote as significant 10% change for the six-state region. The addition of carriers in four to ix states in 1951 should increase the significance to the 7 or 8% level, ince it is probable that the distribution will be similar and the samples ill have similar variation.

Weather data furnished by carriers proved too cumbersome to attempt o evaluate. Since individual counts of doves along roadsides or on plots xhibited high variation, even over the same routes under apparently similar eather conditions, it is suggested that subsequent weather data be obtained rom one or two U. S. Weather Bureau stations in each major ecological type, nd that the effects of gross weather factors such as extensive cold fronts, r prolonged and widespread precipitation, be analyzed in comparison with ubsequent annual censuses. Major weather conditions will influence the ensus results considerably.

omparison of Census Methods

Table 7 compares statistics obtained from an examination of data athered. It will be noted that in the six-state region 2,923 rural mail arriers furnished an index for the region which will denote a ten per cent hange in the average number of doves seen along their routes, providing that he variability and other characteristics of the distribution remain the same rom year to year. Data from rural mail carriers possessed less relative ariation (as shown by the smaller coefficient of Variation, V) than data from ther types of censuses.

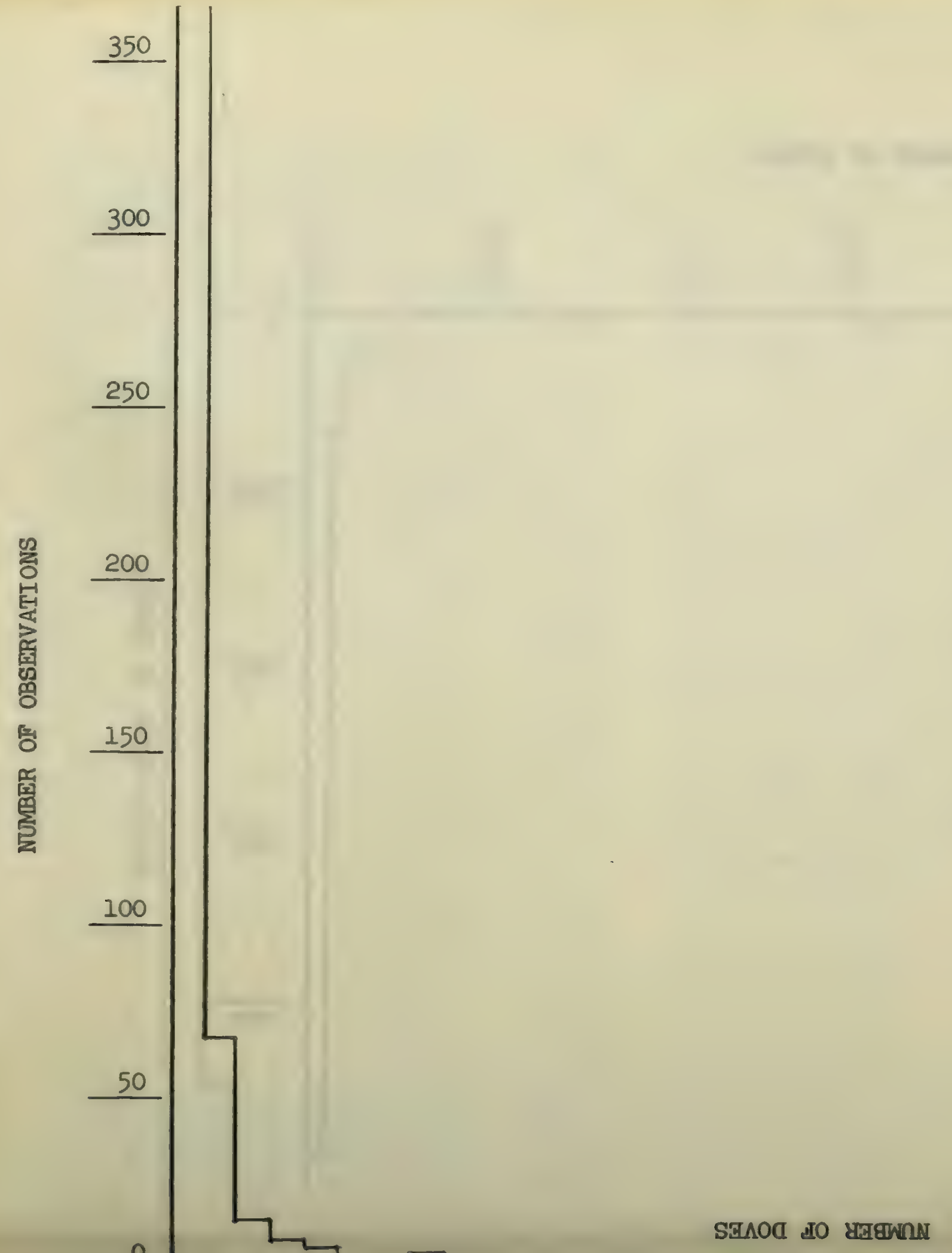
Because of the reverse "J" shape of the distribution and the coniderable variation among the individual items about the mean, a very large umber of sample transects are required to denote a ten per cent change in verage numbers observed. Of the four methods tested, only the rural carriers an furnish a large quantity of data at small cost.

A common type of distribution of occurrences of doves along roadides or on plots has already been noted. In all states biologists on road ounts recorded the number of doves seen as they occurred. These data permit n analysis of the distribution of doves as they were observed on the winter ange. Graphs 8, 9, 10, have been prepared from Alabama, Georgia and Kentucky ata. All of these graphs exhibit the same pattern and closely resemble the attern of summarized data plotted in Graphs 1, 2, 4, 5, 6. Apparently doves n the winter range are usually distributed in this fashion -- many occurrences f one to a few birds, and few occurrences of large flocks. (For gregariousness f doves in summer, fall and early winter in Indiana, see Ginn, 1950, Mumford, 950.) As is shown by road counts conducted in the southeast during all months f the year, by retrap information from southeastern banding stations, and from ield work on breeding populations which is reported elsewhere in the newsletter, opulations in the southeast are much more stable during the major breeding eason, from April to July, and probably more evenly distributed throughout the outheast during those months. The natural gregariousness of the species in inter, when populations are fairly stable, (according to a small amount of reap data) makes censusing through small samples virtually impossible.

Changing agricultural practices in the South may cause changes in the attern of gregariousness in the wintering dove population, as well as producing

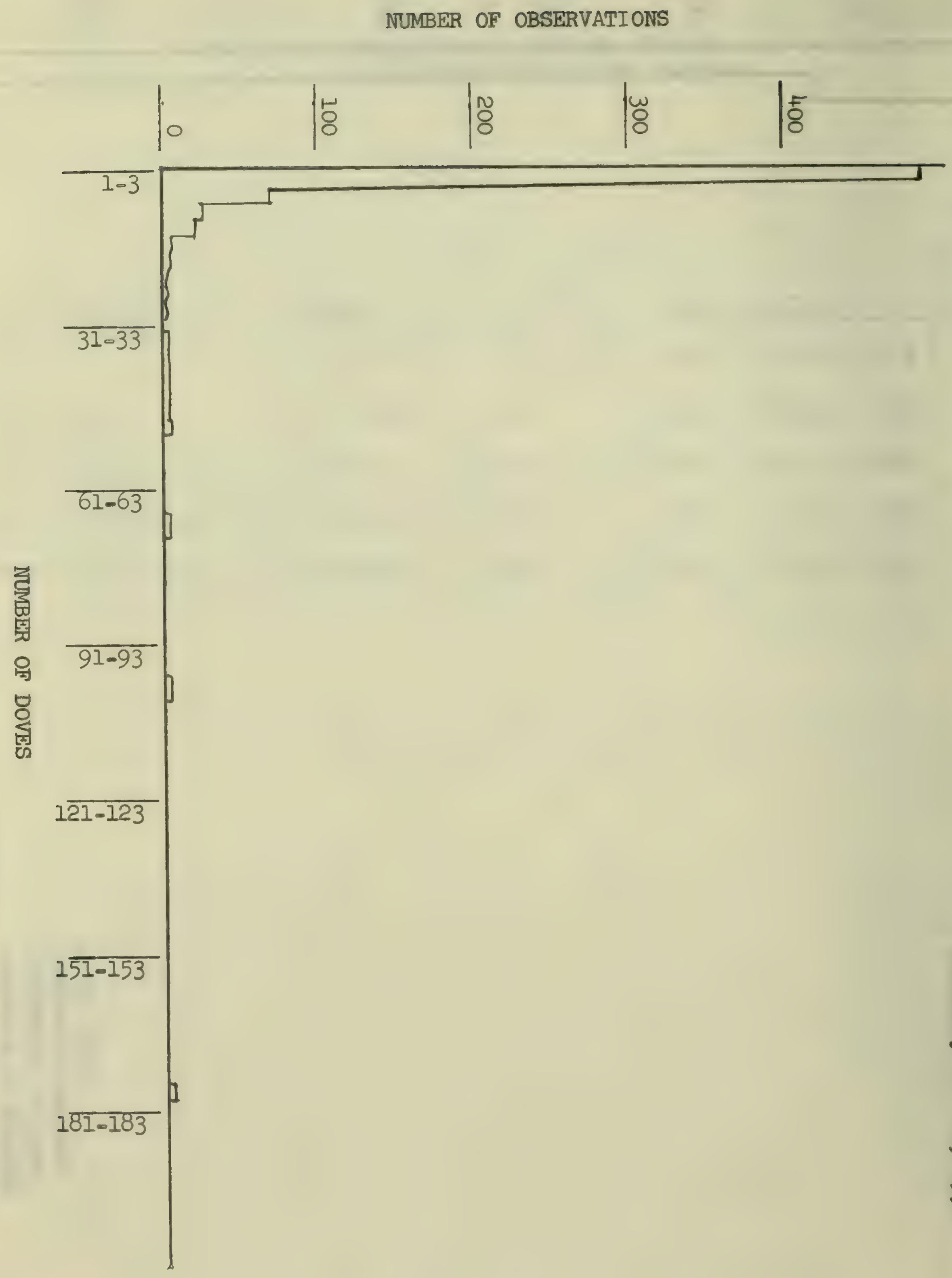
Table 7. COMPARISON OF RESULTS OF PLOT AND THREE TYPES OF ROADSIDE CENSUSES

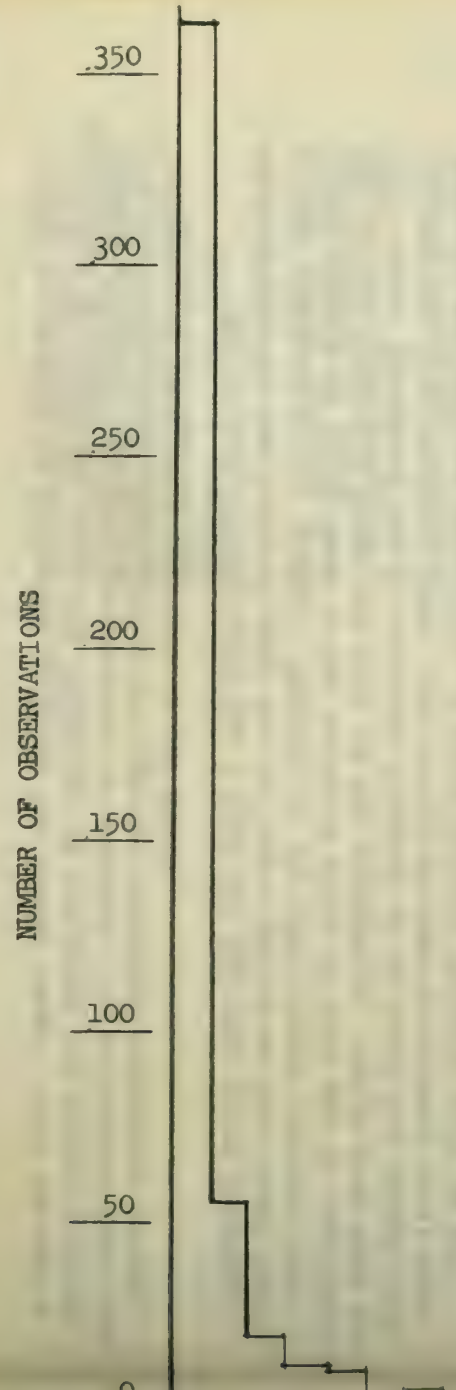
Census Type	Number	$\overline{X}$	σ	$3\sigma_m$	V	% Cha $\overline{X}$ for nific
Plot	195 (Alabama)	8.4 doves	23.3	5.01	277%	59
Biol. Road.	202 (Alabama)	13.8 "	38.0	8.01	275%	
Warden Road.	81 (N. C.)	100.3 "	217.5	72.6	216%	
Rural Carriers Rd.	575 (Alabama)	21.4 "	35.2	4.4	169%	20
Rural Carriers Rd.	2923 (Region)	16.9 "	29.3	1.63	173%	9



Graph 8: Size of Dove Flocks Observed by Alabama Biologists on Road Transects February 6-10, 1950

Biologists on Road Transects
February 6 - 10, 1950





Graph 10: Size of Dove Flocks Observed by Georgia Biologists on Road Transects, February 6 · 10, 1950

shifts in density on different parts of the winter range. Only through a region-wide inventory involving thousands of transects can a near-accurate picture of wintering dove populations be obtained. It is evident that this can be economically accomplished through the voluntary assistance of the thousands of rural mail carriers in the South.

The winter of 1949-1950 was a mild one and many doves probably did not move as far south or stay for as long a period as they would during a more rigorous winter season. Results of the 1950 census indicate that large numbers of doves were in the northern parts of what may be considered the normal wintering range for most of the population. While data from the 1951 winter inventory can be compared directly in at least six states with information from February 1950, this should be done cautiously until more data are available on the effect of major weather factors, such as prolonged cold fronts on the census itself as well as upon the part of the dove population wintering in the southeastern census area.

Some correlation was found between biologist roadside counts and rural mail carriers roadside counts, Graph 11, but virtually none between plots and rural carriers road counts (Graph 12), by major ecological types by states.

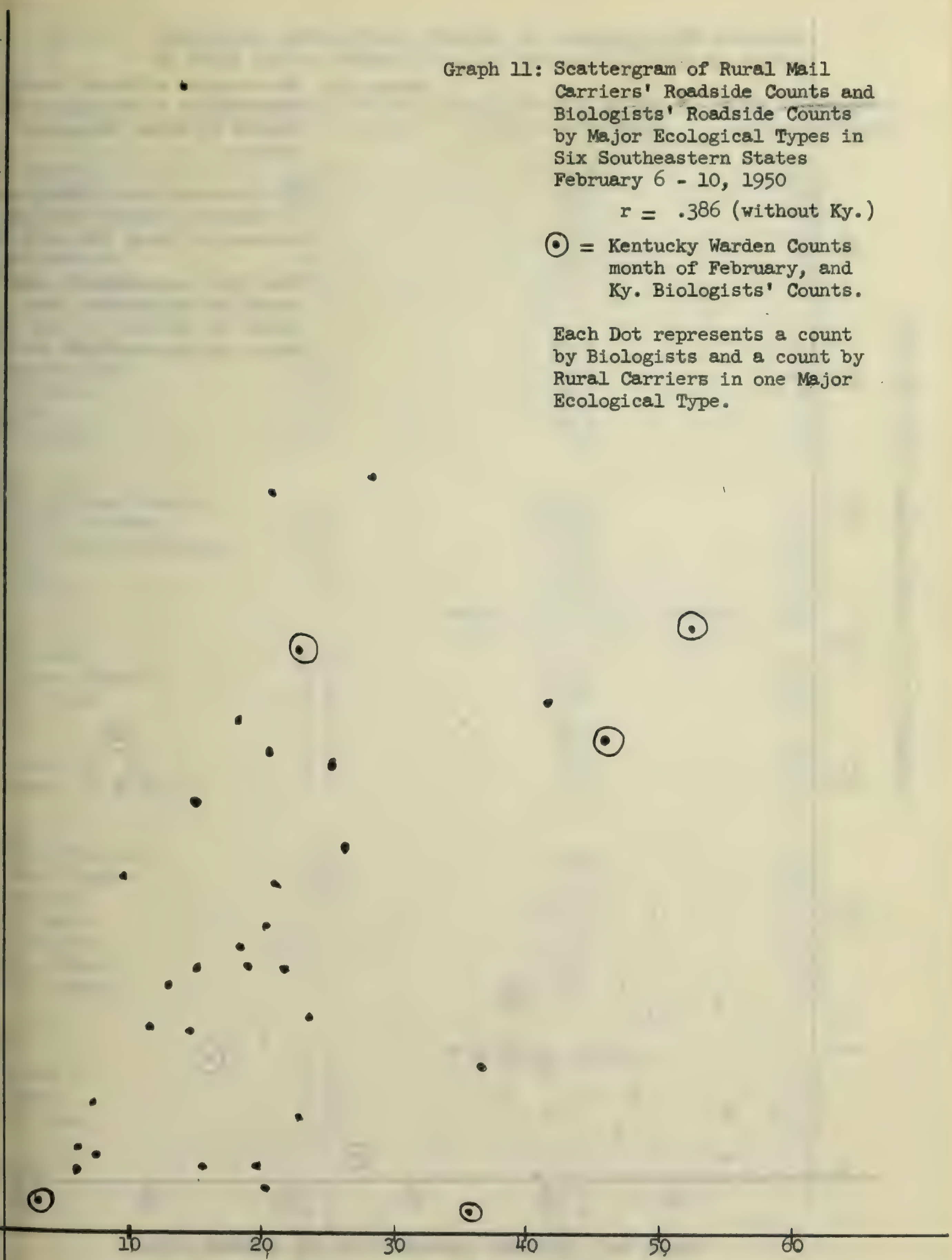
Biologists generally observed more doves per hundred miles than did mail carriers in the same major types, but the lack of a sufficiently large number of biologist transects and, in some major types, rural mail carrier transects, and the innate variability of these small samples, yielded small positive correlation. (r = .386) The relationship may be curvilinear rather than straight. This was not tested because the scattergram (Graph 11) indicated that the correlation would be low. Table 8 summarizes common averages of rural mail carrier and biologist road transects and plot counts by states by major ecological zones.

Comparison Between Winter And Breeding Inventories

Eventually, under the cooperative dove study, there will be developed a series of population measuring sticks which will permit a ready assaying of the Eastern dove population on an annual basis for purposes of regulation. The question of determining usefulness and adaptability of census indices taken at different times during the year for information on which to base regulations will depend upon characteristics of the population itself, upon how well the several indices depict trends, and the seasonal period of maximum dove mortality.

Banding records have yielded imperfect estimates of the annual mortality of the species at from 55% to 80% of the population, with probable heaviest mortality among juveniles, as occurs in other species. Since insufficient reliable information on seasonal mortality will be available from banding returns for some years, possibly this period can best be designated through comparison of trends from indices of the population taken at different seasons. Once this is done, and a pattern established, only the most reliable and most economical censuses need be conducted on an annual basis.

Analysis of data obtained from cooing censuses conducted by H. S. Peters and others during the breeding period suggest that the cooing level will furnish a breeding population index which will prove more economic and have higher statistical reliability than rural mail carrier road counts c ducted during the winter. A combination of cooing counts and July road count

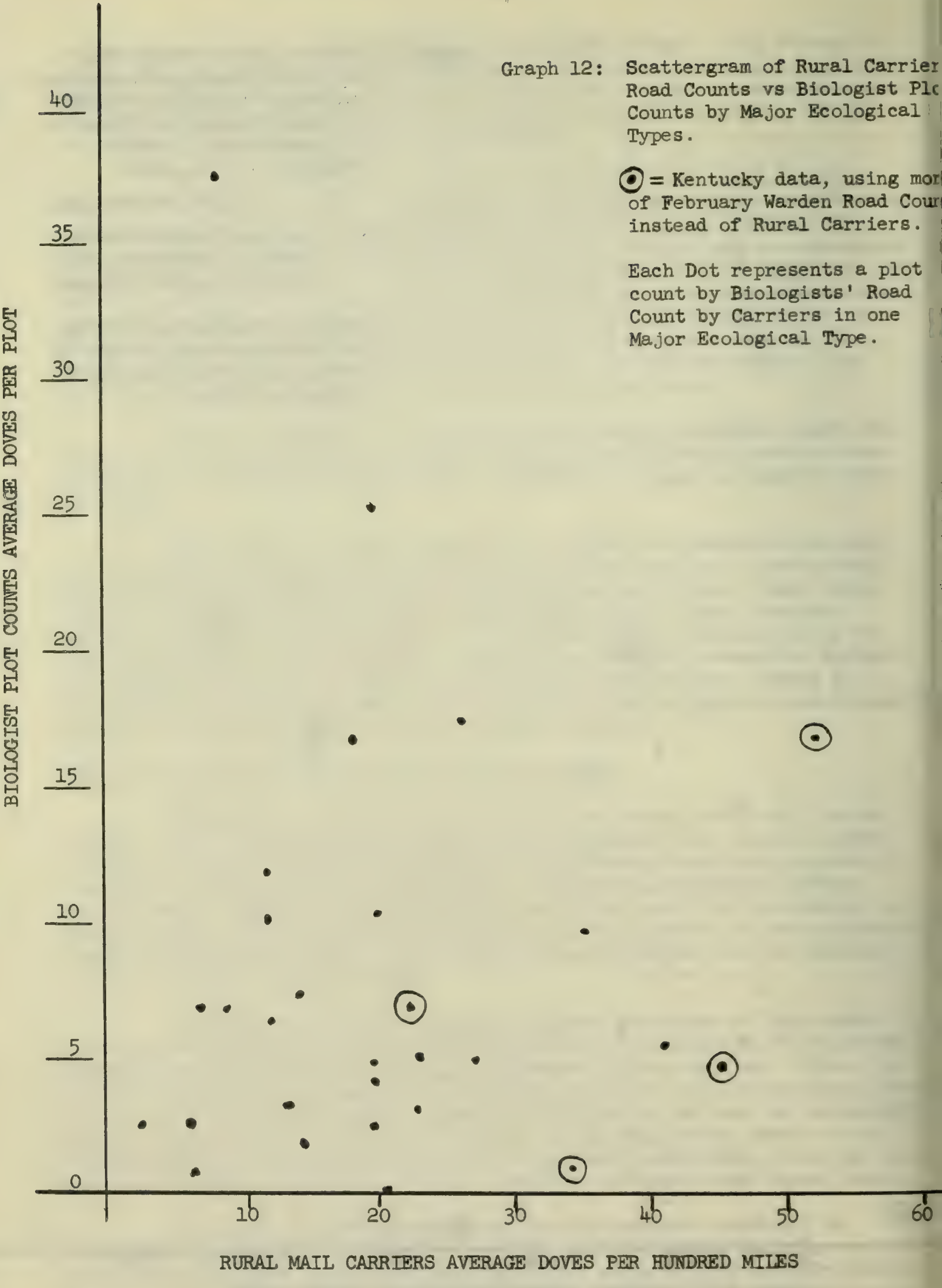


Graph 11: Scattergram of Rural Mail Carriers' Roadside Counts and Biologists' Roadside Counts by Major Ecological Types in Six Southeastern States February 6 - 10, 1950

r = .386 (without Ky.)

⊙ = Kentucky Warden Counts month of February, and Ky. Biologists' Counts.

Each Dot represents a count by Biologists and a count by Rural Carriers in one Major Ecological Type.



Graph 12: Scattergram of Rural Carrier Road Counts vs Biologist Pl Counts by Major Ecological Types.

● = Kentucky data, using mor of February Warden Road Cou instead of Rural Carriers.

Each Dot represents a plot count by Biologists' Road Count by Carriers in one Major Ecological Type.

Table 8. COMPARISON AMONG AVERAGE NUMBERS OF MOURNING DOVES REPORTED BY THREE CENSUS METHODS BY MAJOR ECOLOGICAL TYPES BY STATES

	Biologists D/100 mi. (common averages)	Rural Carriers D/100 mi. (common averages)	Plots D/1/4 sect. (common averages)
a			
r Coastal	32.6	22.9	2.6
r Coastal	28.6	11.9	12.9
mont	55.4	19.5	4.9
k Belt	110.0	19.7	2.4
lachian Mts.	24.5	35.6	9.5
stone Valleys	78.1	41.2	5.4
a			
stone Valleys	67.3	23.7	5.0
lachian Mts.	37.3	20.2	10.3
r Coastal	33.4	9.0	6.9
mont	29.3	13.3	3.2
r Coastal	19.4	7.0	6.9
ky			
son Purchase Region	86.1	22.0*	6.8
issippi Plateau	71.5	45.4*	4.5
and Knobs and Barrens	88.2	51.8*	16.5
grass	1.7	35.2*	.9
tainous	2.3	2.5*	2.5
ana			
La. Pine	36.2	11.9	6.1
r Miss. Flood Pl.	57.1	26.3	17.2
over Pine	51.8	19.6	25.6
rie	4.4	20.1	0
h	10.0	7.5	37.5
r Miss. Fl. Pl.	7.4	6.5	2.4
Hwds., E. Miss. R.	8.7	19.3	3.9
see			
.River Bottoms	2.7)	14.9)	2.0
Tenn. Plains	16.5)	)	1.6
land Rim	76.5	18.1	16.6
ral Basin	38.1	14.5	7.6
erland Mts.	173.0	11.8	10.0
enn. Valley	112.3	27.3	4.9
a Mt. Range	9.7	6.5	0.7
as			
a	24.0	No Rural Carriers	7.7
Coast Pl.	3.7		3.3
k Mts.	6.7		0.5
hita Mts.	5.8		0.5
sippi			
Hwd.	45.3	19.9	
Hwd.	63.3	12.4	
Pine	41.4	18.0	
a	39.5	18.3	
rie	16.9	22.4	

* Warden road counts, February, 1950.

may prove to be the best indicator of the pre-hunting season population from the standpoint of regulations. Until the seasonal mortality can be determined, however, and the relationships between hunter success, breeding, productivity, and wintering indices examined, all seasonal population indices should be continued. The best winter population index, from a statistical standpoint, can be obtained through the cooperation of rural mail carriers throughout the normal winter dove range. This index must be used with caution, at least until an analysis can be made of the results of several winter rural-carrier censuses in relation to gross weather factors and other factors which may affect the number of doves wintering in the area censused.

MOURNING DOVE INVESTIGATIONS OUTSIDE OF REGION IV

Harold S. Peters
Branch of Wildlife Research

The Cooperative Mourning Dove Study was extended into 17 states outide of Region 4 and two Canadian provinces during 1950. Since great numbers f doves produced in northern and central states migrate into the southeastern tates for the winter months and hence are subjected to hunting in Region 4, t seemed necessary to gather information from this important section of the reeding range. While the dove is not a game bird in 24 states, including ost of the northern states, it is important to 28 states which hunt the species nd especially to Region 4.

The income from the sale of hunting licenses cannot be used for invesigation of a species not hunted in the northern states, therefore, we appealed o wildlife technicians outside of Region 4 to gather some information on doves n connection with their regularly assigned projects. We also asked certain ird banders, college professors and students, game wardens and other interested ersons to participate in this extensive cooperative investigation. Rather han merely asking for "information on doves" we asked their cooperation in one r more of three suggested phases of the dove study.

1. We asked the wildlife technicians and some of the other persons to participate in a periodic roadside count in which the number of doves observed over a selected route would be recorded at daily, bi-weekly, or weekly intervals. We advised that these routes should be censused preferably during the first several hours or the last several hours of daylight and requested that doves be reported as singles, pairs, or flocks (three or more doves).

2. We asked many of the other persons to make observations on a selected study area, usually around their home or place of work, at periodic intervals, preferably once or twice weekly. The study areas could be of any size but a minimum of five acres was suggested. During the visits to each area information on the location and number of dove nests was to be recorded on forms supplied by this office. The number of broods raised, the total production of young, the movements of juveniles, the extent of the nesting season, and the flocking and migration of juveniles and adults were all to be recorded on each area.

3. Those persons who held bird banding permits or who could operate under a Master Permit were asked to band nestling doves and also to trap and band flying doves.

Excellent results were secured from our request for cooperation for ver 100 individuals participated and contributed information. Table 1 gives summary of most of these cooperative efforts while Table 2 lists the names nd addresses of cooperators who furnished the most helpful information from ach state. Undoubtedly, other persons assisted many of these individuals in athering information and we wish to thank everyone who contributed to this imortant study. Tables 1 and 2 include a number of persons from the Mississippi nd Central Flyway states, many of whom hunt the Mourning Dove. No distinction as been attempted between information on the Eastern Mourning Dove and that on he Western Mourning Dove.

Table 1. SUMMARY OF 1950 DOVE STUDIES OUTSIDE REGION IV *

States	Cooperators	Study Areas	Nests Studied	Road Counts	Coo Counts	Doves Band	
						Nestlings	F
Colorado	1	0	0	1	0	0	
Illinois	4	2	3	1	0	67	
Indiana	12	6	111	12	0	52	
Maine	1	0	0	1	0	0	
Maryland	9	0	0	4	3	0	
Michigan	12	2	4	13	0	28	
Minnesota	4	2	38	0	0	34	
Missouri	2	1	14	2	0	38	
New York	4	3	20	18	10	8	
North Dakota	2	5	50	5	0	96	
Ohio	38	14	567	106	45	666	
Oklahoma	2	1	210	0	0	300	
Ontario	2	1	5	1	0	0	
Pennsylvania	4	5	7	9	14	1	
Texas	1	2	550	0	0	1002	
Utah	2	0	0	1	0	0	
West Virginia	1	0	0	1	0	0	
Wisconsin	4	5	260	2	1	257	
Total:	105	49	1839	177	73	2549	

* Incomplete since reports from all cooperators have not yet been received or summarized.

TABLE 2.

ROADSIDE COUNTS CONDUCTED BY:

COLORADO
F. F. Poley, Denver
I. R. Poley, Denver

ILLINOIS
Carl Eggert, Elgin

INDIANA
Mrs. Ralph Bidgood, Indianapolis
Wm. E. Ginn, Columbia City
C. K Hunter, Upland
Mrs. Goethe Link, Indianapolis
Mrs. W. P. Morton, Indianapolis
R. E. Mumford, Brazil
Mrs. C. W. Myers, Indianapolis
W. H. Rusch, Fort Wayne
R. D. Siefried, Piqua

MAINE
J. H. Hunt, Fairfield

MANITOBA
Ed Cole, Winnipeg
Wm. Kiel, Winnipeg

MARYLAND
A. J. Duvall, Laurel
C. S. Robbins, Laurel

MICHIGAN
O. M. Bryens, Three Rivers
B. J. Gryska, East Lansing
F. W. Rapp, Vicksburg
W. F. Van Dien, Lansing
Rev. J. L. Ward, Coopersville

MINNESOTA
G. W. Lehrke, St. Cloud

MISSOURI
Howard M. Wright, Columbia

NEW YORK
A. J. Duvall, Laurel, Md.
C. S. Robbins, Laurel, Md.

OHIO
C. R. Goslin, Lancaster
Robert Hayman, Carey
Mrs. George Jaster, Carey
W. C. Knoblaugh, Tiffin
G. C. Peters, Groveport
H. S. Peters, Atlanta, Ga.

OKLAHOMA
Monte Dodson, Oklahoma City
Chas. R. Maloy, Stillwater

ONTARIO
Dr. Keith Reynolds, London

PENNSYLVANIA
A. J. Duvall, Laurel, Md.
C. S. Robbins, Laurel, Md.
Robert L. Smith, Reynoldsville

UTAH
G. S. Gashwiler, Salt Lake City
Leslie Robinette, Salt Lake City

WEST VIRGINIA
Hans Uhlig, Elkins
Robert G. Wingard, Romney

WISCONSIN
Miss Maragaret E. Morse, Viroqua
D. R. Thompson, Madison

INVESTIGATIONS WERE MADE ON STUDY AREAS BY:

ILLINOIS
W. D. Carter, Carterville
Carl Eggert, Elgin
Harold Hanson, Urbana
C. W. Kossack, Barrington

INDIANA
A. E. Andrews, Syracuse
Wm. B. Barnes, Indianapolis
W. E. Ginn, Columbia City
R. A. Johnson, Oneota, New York
Mrs. Goethe Link, Indianapolis
Mrs. W. P. Morton, Indianapolis
Mrs. C. W. Myers, Indianapolis
D. E. Stullken, Lafayette

MARYLAND
A. J. Duvall, Laurel
C. S. Robbins, Laurel

MICHIGAN
F. W. Rapp, Vicksburg
Rev. J. L. Ward, Coopersville

MINNESOTA
Wm. C. Hickling, Minneapolis
P. B. Hofslund, Duluth
John Tester, Minneapolis
D. W. Warner, Minneapolis

MISSOURI
G. S. Graff, St. Charles

NEW YORK
A. J. Duvall, Laurel, Md.
C. S. Robbins, Laurel, Md.
A. E. Westerfield, Bronx
Cyril Wolfling, Alden

NORTH DAKOTA
Wilbur Boldt, Ames, Iowa
Donald V. Gray, Upham

OHIO
John Anderson, Port Clinton
G. R. Austing, No. College Hill
L. A. Gatts, Lorain
C. R. Goslin, Lancaster
Delmar Handley, Castalia
Mrs. Kathleen S. Hostetler, Breeksville
Eugene Knoder, Columbus
Miss Margaret Maurer, Kent
Dr. E. C. Myers, Bowling Green
J. E. Peters, Groveport
H. S. Peters, Atlanta, Ga.
Richard Schlup, Kent
Larry Shafer, Toledo
Laurel Van Camp, Genoa

ONTARIO
C. H. Bennett (and others), Ottawa

ENNSYLVANIA
A. J. Duvall, Laurel, Md.
C. S. Robbins, Laurel, Md.
Robert L. Smith, Reynoldsville

EXAS
Wendell G. Swank, College Station

ISCONSIN
H. S. Mathiak, Horicon
Miss Margaret E. Morse, Viroqua
Fred H. Wagner, Madison

BANDING WAS DONE BY:

LLINOIS
W. D. Carter, Carterville
C. W. Kossack, Barrington

NDIANA
D. E. Stullken, Lafayette

ICHIGAN
Mrs. Alice D. Miller, Dearborn
W. F. Van Dien, Lansing
G. J. Wallace, East Lansing

INNESOTA
Wm. C. Hickling, Minneapolis
John Tester, Minneapolis
D. W. Warner, Minneapolis

ISSOURI
G. S. Graff, St. Charles

EW YORK
Cyril Wolfling, Alden

ORTH DAKOTA
Wilbur Doldt, Ames, Iowa
Donald V. Gray, Upham

HIO
John Anderson, Port Clinton
F. B. Chapman, Columbus
C. R. Goslin, Lancaster
Delmar Handley, Castalia
H. S. Peters, Atlanta, Ga.
Ray Sickels, Athens County
E. S. Thomas, Columbus
Laurel Van Camp, Genoa
Matt Wright, Athens County

KLAHOMA
Charles R. Maloy, Stillwater

EXAS
Wendell G. Swank, College Station

ISCONSIN
Harold A. Mathiak, Horicon
Donald R. Thompson, Madison
Fred H. Wagner, Madison

COO-ROAD COUNTS WERE CONDUCTED BY:

MARYLAND
A. J. Duvall, Laurel
C. S. Robbins, Laurel

OHIO
H. S. Peters, Atlanta, Ga.
Mrs. H. P. White, Brecksville

NEW YORK
A. J. Duvall, Laurel, Md.
C. S. Robbins, Laurel, Md.

PENNSYLVANIA
A. J. Duvall, Laurel, Md.
C. S. Robbins, Laurel, Md.

WISCONSIN
D. R. Thompson, Madison

ummary of Periodic Roadside Counts:

For this Newsletter the roadside count routes will not be listed nor ommented upon individually but perhaps some general statements of the results ill be of interest to all cooperators. A study of the tabulation sheets for he routes shows that those which were run throughout the season from March or pril until August, September, or October showed the movement of migrating oves, the stable nesting population, the beginning of nesting, production of uveniles, summer and early fall flocking of juveniles, departure of most of he juveniles, and the movements of migrants. Some routes show indication of uccessive broods of young. Those routes which did not extend over the entire esting period are more difficult to analyze unless reference is made to the ore complete routes previously mentioned. When many routes are studied, it s often possible to lump the results to provide more complete information. oadside counts made at irregular intervals or those made only once or twice howed little or no information of value. Consequently, we recommend that oadside counts be made only at periodic intervals over the same route, unless any thousands of miles of miscellaneous driving can be summarized to give inormation on movements and production of young for a state or ecological habiat of a state.

Several states, particularly Indiana and Ohio, have made counts of oves in August or September when their annual roadside pheasant count was made. y comparing these counts from year to year some indication of the fluctuation n dove populations is indicated. However, we feel that many more miles of uch routes should be run to produce reliable statistical information. ourning Doves can often be recorded in connection with routine counts of other ame species with little or no additional expense for time or labor. We should ike to have similar participation from many state game departments and biologists.

ummary of Study Areas:

A few more persons contributed information from study areas than ran oadside counts. On the whole their information contributed greatly to our nowledge of the breeding population of doves in many parts of the range. Howver, these study areas were not of sufficient size and number in most states o furnish information concerning the population of that state in comparison o breeding populations of other states, either in or outside of Region 4.

We feel that much additional information can be gathered from similar tudy areas during 1951 and hope that these will be extended in size and inreased in number. Unless these areas are studied during the entire nesting eason it is impossible to ascertain the total number of broods and production f young per unit area. Of course, the number of breeding pairs per unit area an be ascertained on a single careful survey of any study area. However, we elieve it is advisable to spend a minimum of three months on any study area. n this time some valuable information can be secured on the number of broods nd the production of young birds, as well as determining the nesting success nd other important points. In North Dakota, Ohio, Texas and Wisconsin selected reas were intensively studied by graduate students or other biologists. In ost of the other states study areas were conducted by bird banders, game warens, students, and other interested persons.

Banding:

A total of 3,000 doves were banded outside of Region 4 by many pers who furnished banding data to this cooperative study. Over 2,500 of these we banded as nestlings. While nest mortality is high among many birds and the banding of nestlings is usually discouraged by the Fish and Wildlife Service, special permission has been granted to all banders to band nestling doves during the course of this study. We need to know more about the movements of those doves whose place of origin is definitely known. Even though the rate of recovery of nestlings is considerably lower than that of doves banded as immature or adult, we feel that information is vitally needed and therefore we have urged that nestlings be banded whenever possible. Nestlings can easily be banded on study areas where nests are observed at periodic intervals or around yards and homesteads.

In Texas a nest trap has been developed by Wendell Swank for catchi adults on the nest. This has been used with considerable success in several other states for catching adults for banding and marking, so that information may be obtained on the number of broods raised by marked birds. Care in the use of this trap should prevent undue nest desertion and Swank advises agains using it while eggs are in the nest. He has very good success when young nestlings are present.

More efficient traps are needed for catching immature and adult dov and many types have been tried by cooperators. A funnel entrance type (which is always set) seems to be preferable over the trigger door type, which must reset after springing. Several types of funnel entrance traps have been trie and a clover leaf, or modification of it, has been found very successful. Detailed instructions for constructing such a trap are given by Seth Low on ano page. Use of a projected net or other types of nets should be investigated m thoroughly. Information on traps and trapping techniques is often given in t P-R reports and this will be summarized and distributed in future issues of this Newsletter.

Disease:

Intensive investigations on dove study areas have brought to light considerable number of nestlings killed by the protozoan Trichomonas gallinae during 1950. This has been found in three counties in Ohio, several counties in Indiana, and occasionally in several other northern states. While no outbreak has been reported in northern states during the past summer which approaches the serious situation in Alabama, there may be an important mortal of nestling doves due to this disease. Careful attention should be given to this possibility during 1951.

The disease can be diagnosed fairly definitely in the field by the cheesy-like yellow tumors, or masses, in the throat, mouth, or along the side of the neck. Frequently these tumors obstruct the digestive tract and the bi starve to death. While all ages of doves seem to be affected, the adults frequently recover from the disease but may still serve as carriers and infect nestlings during the feeding process. Some of these protozoans are undoubted carried by pigeons, domestic poultry, and possibly some wild birds. Consequently, doves may be infected by feeding around hog lots, chicken yards, and similar places. Reports of this disease or suspected infection should be made to Dr. Carlton Herman, Patuxent Research Refuge, Laurel, Maryland.

arking:

In connection with various phases of the dove study it may become imortant to mark birds for individual identification for sight observation. arious colors and types of aniline dyes have been used, especially those prouced by DuPont. Orange and scarlet show striking contrast with the dove's lumage and seem most satisfactory. They work especially well on the white tips f tail feathers and the juvenile plumage. Quick-drying automobile lacquer or irplane dope has been used by several investigators with fair success. When hese are used it is necessary to prevent matting of the feathers until the acquer dries. When marking wing feathers this can be done by keeping the wing pread for the short time required. We have found it helpful to put a small it of yellow lacquer on the upper mandible of an adult dove which is indiidually marked. This attracts the attention of the observer when the bird is itting on a nest. If the bill is thus marked, the bird should be carefully bserved to distinguish the additional mark or dye which identifies that indiidual.

ging of Immature Doves:

Swank (in Texas) and Jenkins (in Georgia) are rearing doves in capivity to record the rate of molt of the juvenile primaries. While there is ome evidence that the rate of molt in captive birds differs from those in the ild, nevertheless, we feel that this technique is important and will be helpul to many investigators.

When immatures are trapped it takes only a few seconds to spread one ing and record the number of juvenile primaries present. Subsequent repeats f these individuals will provide helpful information on the rate of molt. This nformation can be kept by the more reliable and experienced banders. When irds are examined in hunters' bags the approximate age can be determined by reording the number of juvenile primaries. This will provide a useful tool in tudying the relative importance of various hunting seasons. It is always deirable to harvest some young from each brood rather than to take the bulk of irds from one or two broods. Also, it is important to allow the young to ttain suitable size for preferred sport shooting.

ish and Wildlife Service Investigations:

The Service assigned three biologists to dove investigations in orthern states during 1950. This was to develop and test techniques for the etermination of breeding populations and production of young, and to secure nformation which could be compared with similar data in subsequent years to ive indications of fluctuations in dove populations for a particular area, a tate, or the entire range of the bird. Allen J. Duvall and Chandler S. Robbins orked in Maryland, New York, and Pennsylvania from mid-May until the end of une. They found that random roadside counts seemed to furnish little helpful nformation; so they tested a combination coo-road count taken during the first ours of daylight.

Harold S. Peters conducted similar studies in Franklin and Ottawa counies, Ohio during three months of last summer. He found that periodic roadside ounts over the same route provided more reliable information than random roadide counts; however, most of his work was devoted to testing the coo-road counts 13 routes. Three counts were made over most of these routes at approximately monthly intervals. His routes were conducted in the same manner as those of Duvall and Robbins although he standardized the coo-road count to cover a two hour period in the early morning.

These routes started one-half hour before local official sunrise and were conducted over secondary roads previously selected from county road maps. Twenty stops of three minutes each were made at one-mile intervals for a standard route. A speed of 25 miles per hour was maintained between stops and records kept of all doves seen during this mile interval. Doves observed whil stopped at each station were also recorded. The number of doves heard cooing at each station was carefully noted and often the number of times each individual dove cooed was kept. Usually no difficulty was experienced in distinguishing the number of individuals cooing at one station, although occasionally it was somewhat difficult to distinguish the number of coos given by each individual. The twenty-station route was completed approximately one and one-half hours after local official sunrise. Consequently, each route required about two hours.

This coo-road count was selected as a standard for future use and is recommended to cooperators in the northern states and also to the P-R project leaders in Region 4. We urge that such coo-road counts be made over selected routes at intervals throughout the entire nesting season during 1951. We believe that much helpful information will accumulate during the coming year through the cooperation of investigators conducting counts under this standardized suggestion and that we can compare the breeding populations of differe routes and different states, as well as determine the fluctuations in breedin populations from year to year on such routes.

While Duvall and Robbins determined that the rate of cooing decrease with the advancing day, it may be advisable to run a 40 station route, which would require about four hours, in order to make more efficient use of time available to certain biologists or other cooperators. However, it would not proper to compare the results of the second two-hour count with those of the first two-hour count of any day.

Leonard Foote carried on coo-road counts in Georgia during 1950 and found that he could secure good results from evening counts. He believes tha cooperation from game wardens and other persons might be secured more easily in conducting evening cooing counts rather than trying to induce them to get early enough in the morning to begin their counts one-half hour before sunris Tests will be run in Georgia during 1951 to determine the relative value of evening and morning coo-road counts. Until the results of such comparative tests are available, we suggest that cooperators outside of Region 4 concentrate on morning coo-road counts.

Plans for 1951:

The extensive dove study will be continued and possibly expanded in other parts of the range of the species during 1951. We shall appreciate cooperation from wildlife technicians, bird banders, students, and other interes persons in one or more phases of the extensive study in their own communities or in connection with regularly assigned projects. The phases which we wish to emphasize this year are as follows:

1. Combination Coo-Road Counts: The standardized twenty-station count beginning one-half hour before local official sunrise should be run at periodic intervals during all or part of the nesting season. Periodic counts of the same route, or routes, are more important than counting a number of routes only once each.

2. Study Areas: Detailed nesting observations can be conducted on selected areas of five acres or more at weekly intervals through all or part of the nesting season.

3. Banding: Intensive banding of nestlings, as well as immature and adult doves, should be conducted by persons holding banding permits or those who can operate under Master Permits granted to their institution or State Game Department.

4. Periodic Road Counts: Periodic counts can be made over a selected route on secondary roads. However, these should be run either very early in the morning or late in the evening and are best conducted at daily, weekly, or biweekly intervals.

Directions for conducting investigations on any of the above phases an be secured by writing Fish and Wildlife Service, Glenn Building, Atlanta 3, eorgia, and forms will be supplied for recording information and observations ecured through these studies. We will appreciate hearing from cooperators ho intend to participate in any of this work and shall appreciate having a ummary of their results sent to us immediately after their work has terminated or the season. Results of this cooperation will be distributed to all persons ho cooperate through Dove Newsletters at irregular intervals.

SUGGESTIONS FOR TRAPS FOR MOURNING DOVES AND QUAIL

by Seth H. Low, Biologist
Patuxent Research Refuge
Laurel, Maryland

These suggestions are for those cooperators who are interested only n trapping and banding doves and/or quail and who do not desire to band other pecies taken incidental to such trapping.

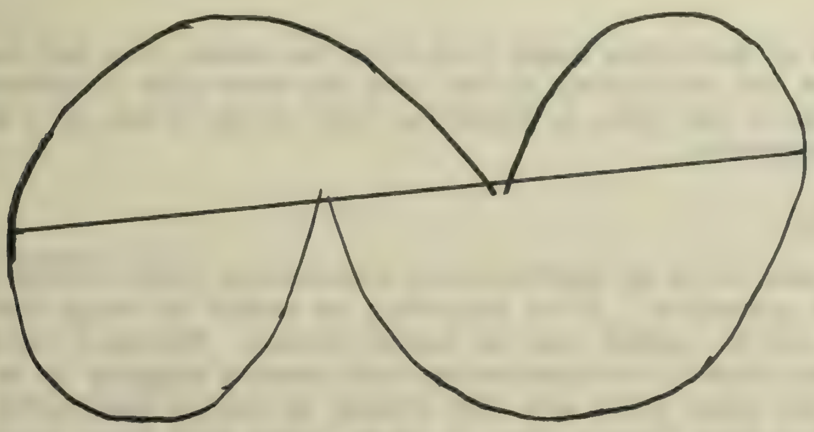
For the general trapping of all species, the multiple-cell, trip-door ypes of traps such as the Potter and Thompson types are excellent. However, ney are impractical for the dove and/or quail trapper as sparrows, mice, dogs, ne wind, and many other things trip the doors. This requires constant re-etting of the trap and reduces the take of doves and quail.

The dove and/or quail bander is primarily concerned with flocks and oncentrations and, hence, needs a trap which has a large capacity, is always et, and is reasonably selective. Two traps meet these requirements: the odified House Trap and the modified Shorebird Trap.

horebird Trap:

The two-cell type (see figure below) rather than the three-cell will e found preferable for doves and quail. These were originally designed for aking shorebirds but recent tests at the Patuxent Research Refuge have demon-trated they are effective as bait traps for doves, quail, and a variety of other pecies. The traps are described in Bird-Banding, Vol. VI, No. 1, Jan. 1935.

The two-cell is very readily constructed. The sides are made of two ieces of hardware cloth, each 2' x 9', the top of light poultry wire 4' x 7', nd the frame is a single stick of wood 1" x 2" x 6-1/2'. The heaviest obtain-ble gauge of hardware cloth is recommended and the mesh should not be larger han 2 or 3 squares to the inch. This provides rigidity and eliminates addi-onal framework. The trap can be readily disassembled for transporting if the our major parts are tied together with heavy cord or light wire. The sketch ndicates the shape of the trap:



ne 1x2 is used to tie the ends of the sides to and to support the roof.

House Trap:

This may be defined as nothing more or less than a square, frame tr The minimum recommended dimensions are 2 ft. high and 4 ft. square. The trap be made portable by making each side as a separate section. A funnel-type entrance is recommended on each side but not the type of entrance on the house which is pictured and described in the 1947 *Manual for Bird Banders*.

General Specifications for Dove Traps:

Sides: Hardware cloth with a mesh not larger than 2 or 3 squares to the inch is recommended and the sides should be at least 24" high. Both are extremely important considerations in reducing injuries and mortality.

Roof: Light poultry netting of 1-1/2 or 2" mesh is recommended. The netting should be loosely, not tightly, stretched. The roof should be at least 24" above the floor of the trap.

Using large mesh poultry netting, rather than hardware cloth for the roof makes the trap selective. The larger species such as doves and quail are retained while the blackbirds, sparrows, finches, etc., escape.

Entrance: A simple funnel entrance is usually the most effective and easiest to construct. This has a wide exterior mouth, is V-shaped, and narrows to an opening *just* wide enough and *just* high enough for a dove or quail to squeeze in. The opening should be so constructed and fastened that it cannot be expanded to allow the entrance of hawks, cats, dogs, and other predators.

Color of Trap: It has been found that traps painted a flat black are more effective than unpainted traps and traps of other colors.

Gathering Cages:

The use of gathering cages with both the house trap and the shorebi trap will increase the efficiency of the trap and save time in removing the b When kept attached to the trap, a gathering cage on the order of a double fun sparrow trap is suggested.

General Precautions:

Traps need to be of sufficiently substantial construction that they not be crushed by predators. It is advisable to anchor or weigh down small t so that they may not be turned over or pushed around. Hardware cloth bottoms are desirable when trouble is experienced with mammals digging in or out of t trap. As a general rule, doves are more likely to injure themselves in small traps which confine them closely than in large traps with ample headroom.

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Atlanta, Georgia

Issue No. 4 June 30, 1951

MOURNING DOVE NEWSLETTER
(Not for Publication)

This issue of the newsletter is devoted to a summary of Mourning Dove opulations from 1949 to date, primarily for the information of the States and the Fish and Wildlife Service for promulgating the 1951 dove hunting regulations. The information contained herein is not for publication or citation under any ircumstances. The following conclusion is placed at the beginning of this report for the purpose of availability.

CONCLUSION

Commencing at least as early as the summer of 1950 there has been a ange-wide reduction in the Eastern Mourning Dove population. Losses from richomoniasis have been severe, particularly in the southeastern states where osses have continued into the 1951 breeding period. Losses from climatic actors during the winter of 1950-51 were heavy in the lower Mississippi Valley, nd possibly Eastern Texas, and fewer doves wintered in the northern and central tates during 1950-51.

The decline which commenced during the 1950 nesting period was partialy compensated for by reduced hunter success during the following hunting season. s compared to 1949 the 1950 nesting period was early, perhaps due to the mild inter of 1949-50. In contrast, the nesting period in 1951 commenced two to three eeks later than in 1950 and nesting success has been poor, at least to date. uring 1949 and 1950 much of the fall dove population was produced between June st and August 15th. Sufficient breeders appeared to be present during the spring f 1951 in the southeast and on the censused portions of the northern breeding ange to produce a normal number of doves for the 1951 hunting season. If the urrent nesting efforts are less productive due to an increase in the incidence of richomoniasis or other causes, appreciably fewer doves will be available to the 951 hunter. Should these losses occur, a reduced hunter kill certainly will be ade during 1951 if hunting regulations remain similar to the 1950 regulations. his reduction of hunter kill will at least partially compensate for any failure f 1951 reproduction. The 1950 hunter kill apparently had little effect on the 951 breeding population. The best information now available, however, indicates hat the 1951 dove hunter will find fewer doves available than in 1950. All data ndicate that the degree of nesting success largely determines the numbers of oves available in the fall.

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ACKNOWLEDGMENT

Data reported were compiled chiefly under the direction of project leaders and cooperators listed below:

James Keeler	Alabama Conservation Department
Harold Alexander	Arkansas Game and Fish Commission
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Henry Bobbs, Jr.	Mississippi Game and Fish Commission
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Fred Wagner	University of Wisconsin
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Liven A. Peterson	" " " " "

We are indebted to the many state game wardens, rural mail carriers, state biologists, Fish & Wildlife Service personnel, University associates, students and private individuals who contributed populations information of value. Without the full cooperation and free exchange of information of all cooperators, a summary of the population status of the Eastern Mourning Dove would be impossible.

This newsletter was prepared by:

Leonard E. Foote	Wildlife Management Institute
George C. Moore	U. S. Fish & Wildlife Service
Harold S. Peters	U. S. Fish & Wildlife Service

INTRODUCTION

This issue of the Mourning Dove Newsletter is devoted solely to appraisal of mourning dove populations, up to June 30, 1951. The data indica that the population decline, which commenced at least as early as the summer 1950, has extended into the 1951 breeding season. As of June 30, 1951, it is impossible to estimate the effect this decline will have on the birds availabl to the gunner during the fall and winter, because in a normal year many of th birds available to the gun are raised during the period from late June to late August.

While the cooperative dove study has indices which will measure this reproductive success, they must be used during July and early August to give a true measure of production. The results will not be available for consideration for regulations until about August 15. It is important that some method be devised wherein regulations can be promulgated as late as possible before open hunting seasons so that data on the bulk of the population can be used for regulation purposes. The cooperative dove project has not yet followed the population changes over a sufficient period of years to determine whether there are standard and hard-fixed relationships between winter carry over and the following fall population available to the gun. It is unlikely that either winter or early spring breeding indices will forecast accurately the available fall population, at least until more information is available on the widespread influence of trichomoniasis and its sequence in the eastern dove population. Studies which are now in progress, on the incidence of this disease may yield a pattern which, when combined with breeding indices, can be used reliably to forecast the fall population level. We suggest, therefore, that an effort be made by the dove hunting states and the Fish and Wildlife Service to delay final regulations until about August 15. Perhaps provisional regulations can be published in the Federal Register as required by law, with amendments added at the discretion of the Secretary of the Interior after review of the production data and consultation with the cooperating states.

Marked parallels will be seen in the data presented herein from the entire range of the eastern dove. This indicates the presence of a detrimental factor which operates, apparently, throughout the range of the species. From the small amount of data available from Texas, together with the known importance of Texas as a migration and wintering area for eastern doves, any regulation promulgated should consider Texas and other bordering states in the same category as the southeastern states.

PART I. SOUTHEASTERN AREA

Data gathered under the Cooperative Dove Project on the status of the Eastern Mourning Dove populations from 1949 to 1951 will be considered chronologically to permit a clear understanding of the progress of the decline as well as designation of some of the known causative factors.

1. Population Trend.

Comparison of 1949 and 1950 hunting seasons showed a decrease in the 1950 hunter kill for all early seasons except south Florida. Together these data suggest a partial failure of the 1950 reproduction. Later hunting seasons yielded a kill almost as good as the late 1949 hunting efforts, possibly because adults, which generally migrate later, were less affected by the decline.

John Aldrich found no marked differences in 1949 and 1950

BETWEEN THE 1949 AND 1950 OPEN SEASONS COULD BE MADE.

State	Period	Number Doves 1949	Number Doves 1950	Percent Immature 1949	Percent Immature 1950	Percent adult breeders[2] 1949	Percent adult breeders[2] 1950	Kill per Hour		Percent Crippling Loss 1949	Percent Crippling Loss 1950
Kentucky	September 1-30	888	1,129	65.6	65.1	10.1	11.4	1.54[3] 1.9[4]	1.3[3] 1.6[4]		23
Mississippi	September 16-30	1,996	1,044	69.2	64.6	2.0	4.6		1.8		37
North Carolina	September 16-30	706	1,943	73.2	60.3	9.0	15.3	1.8	1.5		21
Tennessee	September 16-30	465	1,542	69.5	57.3	9.3	5.5	1.9	1.6		36
	October 1-15, '49 October 16-30, '50	203	304	75.2	52.						
Florida[1]	October 1-30	406	418	72.7	89.0	1.8	0.0	1.0	0.7	13	24
Louisiana	December 1-30	424	469	42.5	35.4	0.0	0.0	1.3	1.8		13

[1] Three southern counties
[2] Dove having glandular crop condition
[3] Kentucky FA biologists
[4] Kentucky law enforcement officers

major weather factors which might have changed the migration period or routes. It is indicated, based on hunter bag check, that the peak of the breeding season in 1949 was later than in 1950; however, this may be due to the fact that a larger percentage of late hatched juveniles were in 1950 subjected to trichomoniasis. Table I. This condition may also be due to the mild winter of 1949 which shifted the breeding season earlier. An early hatch would reflect in an apparent lower fall juvenile population, as determined by present aging techniques, as well as in higher road counts during the late spring and early summer.

During the fall of 1950, both trapping success and the percent of juveniles caught in traps in many states declined when compared with the fall of 1949.

2. Winter Inventory.

Comparison of the February 1950 and January 1951 rural mail carrier inventories also reflected a lower population. The declines were in part due to the exceedingly poor censusing weather encountered but rechecks in Tennessee and Mississippi showed lower populations than during early February 1950. An analysis of the effects of the poor censusing weather on the counts indicates that the lower 1951 counts were only partially due to the weather conditions encountered.

It is interesting to compare the doves per hundred miles by states. Table II. Of special interest is data from Tennessee, Kentucky, and Arkansas. These three states show less than 10 birds per hundred miles, whereas the only state with an increase was Florida. Is it possible that the severe winter throughout the southeast caused an almost complete exodus of doves from the three more northern states, whereas the extremely mild winter of 1950 caused an above average number of doves to remain in these states. This is also shown by a comparison of January road counts in Indiana, which appears in the following section of this newsletter. The increase in the number of doves in Florida during February 1951 would further substantiate the theory that the weather may be partly responsible for the reduction in the number of doves in the other states. Actually, the true picture probably lies somewhere between the figures for the two years.

TABLE II

COMPARISON OF 1950 AND 1951 WINTER RURAL MAIL CARRIER DOVE CENSUS
(Based upon nearly a million miles by 3000 carriers in 1950,
and on about two million miles by about 5000 carriers in 1951)

		D/100 Mi.		
tate	1950 No. Carriers	1950	1951	1951 No. Carriers
eorgia	361	17.0	15.2	497
ennessee	935	17.7	5.5	728
ennessee, 1951 Re-check			7.1	796
lorida	228	14.1	17.4	234
labama	575	21.4	10.4	555
ouisiana	110	17.6	11.6	242
ississippi	515	18.0	Data being compiled	
ississippi, 1951 Re-check			Data being compiled	
orth Carolina	No data for 1950		13.8	589
outh Carolina	" " " "		11.1	488
entucky	" " " "		6.2	506
rkansas	" " " "		6.8	516

3. Breeding Counts

Breeding counts are compared for the months of April, May and June during 1949, 1950, and 1951. Several types of indices have been used and results can be best summarized in tabular fashion by states. Table III presen a summary of all random road counts made by project personnel in the southeast states. The almost uniform decrease in number of doves observed will be appar from the table. Random road counts during the breeding period have more signi cance than similar counts taken during other seasons of the year when doves ar more gregarious, but they must be interpreted in relation to physiography and other factors and results from one state cannot be directly compared with simi counts from other areas. They offer a good annual comparative index for the s areas, however.

Road counts have been conducted in states outside of the southeast a are summarized elsewhere in this newsletter.

Cooing counts are now being conducted for the 1951 breeding season i each of the southeastern states. Comparative population trends based upon the cooing census will be found elsewhere in this report. Evening cooing counts i North Georgia indicated a slight decline in cooing birds in 1951, as compared 1950. At 125 stations, 55 birds were cooing in 1950, while 48 were heard at t same stations in 1951. Table IV summarizes cooing counts from all southeaster states in 1951. Because of the limited number of cooing counts in each state, their chief value lies in comparing these counts from state to state. It is evident that despite the decrease in doves on random road counts, there are st considerable numbers of cooing birds on the breeding range. Project leaders i the southeast and dove workers elsewhere have repeatedly commented that the 19 breeding season has commenced much later than usual. It is, therefore, possib that since many of the birds counted on road counts during April-June are juve the late start of the 1951 breeding season has partially caused the depression road count indices. Results from other breeding censuses are summarized by st below where comparable data are available.

Alabama

"No special breeding studies have been conducted in Alabama except t cooing counts. It should be pointed out, however, that dove nests are extreme hard to find this year. Some small areas, such as barn lots, have been covere this year, which yielded from two to six dove nests during the breeding season 1950 and only one nest has been found in these areas up to the present time. is the writer's opinion that, based on the breeding population of 1949, the 19 breeding population would be approximately three-fourths that of the previous season. The 1951 breeding population would be approximately one-half that of 1949". James Keeler, Alabama Conservation Department.

Arkansas

"Data, reports and observations indicate at least a 50% reduction i breeding birds since 1950. No positive data available except trap records an road counts. Results from these may vary greatly with local and weather condi tions". Harold E. Alexander, Arkansas Game and Fish Commission.

TABLE III

Summary of Random Road Counts in Southeastern States for April, May, and June of 1949, 1950, and 1951. June 1951 data are incomplete.

		1949		1950			1951	
		Mile	D/100 mi.	Mile	D/100 mi.		Mile	D/100 mi.
Ala.	April	1563	7.8	1451	10.4		4003	4.7
	May	2685	10.06	2300	7.6		6214	6.5
	June	2231	17.7	1900	8.8		2412	7.8
Ark.	April	790	16.0	1700	11.6		936	4.2
	May	873	12.6	832	15.5		1679	8.2
	June	1563	10.2	-	-		814	5.0
Fla.	April	-	-	2276	5.6	S. Fla.	7474	26.7
						N. Fla.	5146	21.1
	May	-	-	2784	5.8	S. Fla.	7760	13.8
						N. Fla.	5466	11.4
	June	-	-	605	1.9		-	-
Ga.	April	-	-	1298	7.7		3477	5.28
	May	-	-	1003	7.18		2787	3.84
	June	-	-	731	4.1		2436	5.34
Ky.	April	-	-	-	-		342	4.09
	May	-	-	-	-		5065	4.83
	June						2670	4.45
La.	April	-	-	1647	9.0		7239	2.8
	May	-	-	1279	14.0		9348	7.9
	June	-	-	530	10.9		3652	8.4
Miss.	April	3049	46.6	219	19.2		1097	9.8
	May	3167	21.9	208	21.6		1345	6.1
N. C.	April	-	-	1584	2.1		12838	4.5
	May	-	-	1504	4.1		12977	8.0
	June	-	-	1074	1.9		3645	10.5
S. C.	April	-	-	-	-		1455	5.01
	May	-	-	-	-		2036	6.53
	June	-	-	-	-		415	9.87
Tenn.	April	20586	14.3	1383	14.5		7036	5.2
	May	26336	19.5	1340	21.9		6984	8.4
	June	8662	23.8	1070	26.9		2244	11.4

Florida random road count data not strictly comparable from year to year.

TABLE IV

Average number birds cooing and seen on coo routes by State, 1951, based on a minimum of two coo count routes in each ecological zone in each state.

State	Date	Birds Heard	Birds Seen	Remarks
Alabama	April	15.0	8.9	
	May	14.2	10.3	
	June	7.0	6.0	Only partly completed
Arkansas	April	5.5	15.5	
	May	6.5	9.75	
	June	1.5	4.0	Only partly completed
Florida	April	12.8	4.6	
	May	13.3	4.5	
	June	-	-	
Georgia	April	18.1	4.6	
	May	18.1	2.2	
	June	12.5	3.3	
Kentucky	April	3.22	1.27	
	May	3.97	1.8	
	June			
Mississippi	April	9.0	18.0	One route in Delta Area
	May	12.7	5.4	
	June			
No. Carolina	April	19.7	6.7	
	May	24.7	12.0	
	June	11.0	15.3	
So. Carolina	April	12.5	11.5	
	May	38.75	13.5	
	June	-	-	
Tennessee	April	24.9	8.2	
	May	22.4	9.7	
	June			

lorida

"From data on road counts and other observations, there seems to be good breeding population in Florida this year". Frank Winston, Game and resh Water Fish Commission.

eorgia

"There is no apparent shortage of doves. They are to be found in ll areas of the State at the present time. Doves have been heard cooing rom the big swamps on the coast to the mountains in the north. These could e considered marginal dove habitat, due to lack of agricultural operations.

"County Agents throughout the state were surveyed by a questionaire during the latter part of March 1951. Over 100 returns were made hich were fairly evenly split among 'increase', 'decrease' and 'no change.' here was a slight balance in favor of 'decrease'." Daniel J. Nelson, Georgia ame and Fish Commission.

Table V presents a summary of 4-H Club dove population data gatherd under the Georgia dove project.

TABLE V

SUMMARY OF 4-H CLUB DOVE POPULATION STUDY AREAS

	North Georgia				South Georgia			
	1950		1951		1950		1951	
eriod	No. Areas	Doves/ 100 A.	No. Areas	Doves/ 100 A.	No. Areas	Doves/ 100 A.	No. Areas	Doves/ 100 A.
ar. 16 ar. 31	20	20	33	19.6	26	18.5	50	16.8
pr. 1 pr. 15	16	22.1	52	26.8	13	17.4	49	15.3
pr. 16 pr. 30	18	24.2	54	18.8	21	15.4	48	11.5
ay 1 ay 15	17	21.5	49	24.1	20	18.7	45	15.5
ay 16 ay 31	17	26.5	42	16.7	12	11.5	43	10.9
une 1 une 15	20	20.1	37	17.2	20	17.9	38	12.6

ach study area is of approximately 50 acres.

Tables 6 and 7 present data on population comparisons from two ounties in Georgia by Dan Nelson, Milton Hopkins, Eugene Odum and others.

TABLE VI

MOURNING DOVE POPULATION COMPARISONS, BAKER COUNTY, GEORGIA, STUDY AREAS 1950--1951

	1950				1951			
	N	C	Nests		N	C	Nests	
OLD FIELD AREA	4	0	0	(April 14)	1	1	0	(April 1
	6	4	0	(June 14)	3	0	2	(June 1
PINELAND	1	0	0	(April 20)	3	1	1	(2 years April 1
	2	0	0	(June 14)	2	2	0	(June 1
DIVERSIFIED	4	1	0	(April 18)	4	3	0	(April 1
	0	0	0	(June 12)	2	1	0	(June 1
WINTER	7	0	2	(April 18)	5	0	0	(April 1
CONCENTRATIONS	4	1	1	(June 16)	1	1	0	(June 1
FLOOD PLAIN	7	1	5	(April 20)	10	5	2+	2 Juv. (April 1
	4	3	0	(June 15)	3	2	0	(June 1

There were no major changes in population numbers during the April 1950-51 cruises. A reduction in the population was shown in the June cruises of these areas. An attempt was made to pick out cruise in 1950 that was nearest to 195 date cruise. Nesting has probably been held up for some reason this year but area having highest concentration in 1950 (Flood Plain) at this time now has highest concentration this year (1951). In above N notes birds noted (noted a cooing) and C notes cooing birds and nests - nests (active either young or egg

- - - - - - - - - - - - - - -

TABLE VII

COMPARATIVE DATA FROM POWER'S FARM AREA IN MADISON COUNTY, GEORGIA:

Date	Total No. Doves Observed & Cooing	Cooing Doves	Active Nes
March 29, 1950	14	no comparable data	0
March 17, 1951	13	7	1
April 29, 1950	9	no comparable data	1
April 28, 1951	6	2	1
May 9, 1950	9	no comparable data	0
May 19, 1951	8	4	2
June 14, 1950	5	1	2
June 18, 1951	16	9	5

entucky

The following data furnished by Dan Russell of the Kentucky Division f Game and Fish on controlled roadside counts in Kentucky:

Month	1950 Miles	1950 Doves/100 mi.	1951 Miles	1951 Doves/100 mi.
April	4907	26.0	5162	10.0
May	5884	40.0	3697	13.8
June	3881	36.2	No data	

"Breeding Studies: Doves are late returning and late nesting. Early ests show 37% success, about the same as 1950. Six weeks of cool, dry weather his spring has retarded vegetation as well as nesting. Flocks of immature oves were seen last year in mid-June at the time of the small grain harvest. ome small grain is now ripening and the earliest is being harvested. No flocks ave yet been seen. They may be expected in July or August this year. Absence r presence of flocks of immature doves during July and August will present efinite information on losses to breeding population during the past winter. t this time (June 18, 1951) it is too early to determine from Kentucky data lone whether the apparently low breeding population is due to late returning r over-winter losses. Comparison of controlled census of 1950 and 1951 for all tates in the southeast might show this now.

"The 1951 dove population is below that of this same period in 1950. easons for this cannot be determined at this time from Kentucky data alone. uring March, April, May and into June, less than half the number of doves have een observed than were in this same quarter of last year. Should this deficit ontinue through June and July, and flocks of immature doves fail to show up in uantity by mid-August, a critical condition would result." Dan Russell, entucky Division of Game and Fish.

ouisiana

Controlled road counts conducted in Louisiana by John D. Newsom of e Louisiana Department of Wild Life and Fisheries are as follows:

Month	1950 Miles	1950 Doves/100 mi.	1951 Miles	1951 Doves/100 mi.
April	100	38	1100	8
May	125	33	900	20.5
June*			300	33

June road count incomplete.

Mississippi

Study of nesting concentrations in the Yazoo Delta region of Mississippi was made by St. Clair Thompson and Henry Bobbs of the Mississippi Game and Fish Commission. Comparative populations are as follows:

	1950		1951	
Month	No. Nests	Nestlings Banded	No. Nests	Nestlings Banded
April	21	8	3	0
May	174	90	26	34
June 15	80	133	12	6
Totals	275	231	41	40

"There has been a very sharp decline in the breeding population in the Mississippi Delta Area. I feel that there is a very definite decrease in the dove population, especially in this area. This opinion is based on roadside counts, trapping success, nesting studies, and talking with the men in the field. The exceptionally cold weather in the early part of February caused a sharp decrease in the local population. Large numbers of birds were reported frozen to death throughout the state. The majority of these reports came from the Delta area..." Henry Bobbs, Jr., Mississippi Game and Fish Commission.

North Carolina

"The 1951 breeding population considerably reduced from previous two years. Production appears to be proceeding well considering the proporti ately reduced breeding population.

"Total population also considerably reduced, while the fall migrati of 1950 was an increase over the same period of 1949. The 1951 spring migration was far below expectations and also far below the level for the same per of 1950". Donald G. Allison, North Carolina Wildlife Resources Commission.

South Carolina

"Since no data is available on breeding populations for the years o 1949 and 1950, no contrasts can be drawn. However, during April, May, and Ju of 1951, both trapping data and observation conclude the breeding season to ha been initiated in both the upper and lower coastal plains about the middle of March. A very gradual buildup occurred in these two zones and reached a peak last two weeks of May. The first ten days in June showed a noticeable declin with an attending buildup in the Piedmont Plateau and the foothills of the Appalachian Mountains. The following table represents age ratios and percent of breeding doves at all trapping stations during April and May.

			Age Ratios		Breeding Conditions	
Month	Number of Stations	Doves Banded	Adult	Juvenile	Breeding	Non-Breed
April	7	175	167	8(4%)	71(42%)	96
May	6	121	96	25(26%)	48(50%)	48

"Since all phases of the dove study were not activated until October 950, no data representing trends was collected prior to this date. Trapping ata collected prior to this date provides the only concrete information.

"The opinions of certain Department personnel concludes that dove opulations for the years 1949, 1950, and first half of 1951 are gradually ecreasing. These decreases are proving most noticeable in both the upper and ower coastal plains, especially the latter. Though the downward trend is pparent, it is likewise very gradual". Harold B. Poole, South Carolina Game nd Fish Commission.

ennessee

"All areas under observation have not been the same for the years n question, although in general it was noted that the breeding season this ear was about two or three weeks later than in 1950 and possibly a short period ater than in 1949.

"At present I feel that the breeding population in Tennessee is lower his year than it was in either 1949 or 1950. Data indicate that the 1950 breed-ng population was probably slightly higher than the 1949 population.

"Present data indicate that compared with 1949 and 1950, the 1951 opulation is definitely down". James W. Hammond, Tennessee Game and Fish Com-ission.

4. Trichomoniasis

The status of trichomoniasis in 1950-51. For background information ee Stabler and Hermans' report presented at the 16th North American Wildlife onference (Milwaukee, 1951). The following quotations are from dove project eaders:

labama

"The dove disease, *Trichomonas gallinae*, reached epidemic proportions uring March, April, and May 1951 in Central Alabama. Reports are as yet still oming in from all areas of the state, but not in any great numbers. It was oticed that the disease slacked up during the last part of April and seems to e steadily decreasing. This, in all probability, is due to the majority of the oves "pairing off", in which case the disease would not be so readily noticed. t can be said that the disease also reached epidemic proportions in March and pril 1950. All areas of the state have reported a few cases of the disease ince it was first noticed in Autauga County in March, 1950. It is the writer's pinion that this disease is the prime factor in keeping the dove population in ich a seriously low condition in Alabama."

rkansas

"Three dead birds gave positive (microscopic) diagnosis. Approximate-y 7 other cases were observed or reported which had typical symptoms. Twenty-dd birds were examined for carriers - no organisms found. No data on previous incidence in the state, except that all dead birds examined came from some banding station, in operation, and free of disease last year."

Florida

"No die off of large numbers of doves due to Trichomoniasis has been reported in Florida. A few isolated cases have been confirmed in Washington County, and in Alachua County (both north Florida). In the Hillsborough and Palm Beach County areas (south-central Florida), a few cases are suspected but have not yet been adequately investigated."

Georgia

"Six cases known since January 1, 1951. No large losses reported to date. Known cases widespread."

Kentucky

"In 1950 this disease was reported in 29 counties. Twelve of these reports were verified, in 1951 to date 4 cases have been reported. All were verified. Findings show 25 major losses due to disease."

Mississippi

"Trichomoniasis was first reported in Mississippi on May 8, 1951, in DeSoto County. A second report from Lafayette County was made on May 11, 1951. Both reports were verified by the dead birds sent in to the office and an examination of the birds showed positive evidence of the disease. Other reports have been received of doves being found dead in the Southeastern part of Mississippi. In Stone County, east of Wiggins, Mississippi, a farmer, Mr. Alvin Hickman, reported finding the remains of at least 100 dead doves in a h pasture on his place about the latter part of March. During the same period he found about 50 dead doves around a hog shed near his house, and his daught caught a sick dove in their yard. Thomas Breland, operator of a banding station on the Leaf Refuge, Perry County, found one dead dove in a horse barn at the refuge headquarters which he examined and a swelling in the throat was found. There have been other indefinite reports of doves dying in east Mississippi in the vicinity north of Meridian in Kemper and Noxubee Counties, but these have not been verified. All reports considered, it is believed tha the disease has not become widespread nor has yet reached any serious proportion."

North Carolina

"Nine definite records of trichomoniasis were obtained during 1951. These were all reported during the fourth quarter (March, April, and May).

"During April five definite records of trichomoniasis were obtained - one each from McDowell (April 14),Hoke (April 16), Martin, Person, and Mecklenburg (April 20). About 13 doves were similarly affected from the locality in Mechlenburg County and 6 from Martin County from a concentration of about 150 doves present on a farm there. So far as is known only the one cas occurred at the other 3 localities.

"During May three definite records of trichomoniasis were obtained - two from Wake County (May 8 and 12) and one from Mecklenburg County (May 28). These were the only doves affected in these localities. In addition, during May three reports of probable occurrences in doves were received; one each from Davidson and Rowan counties and one report from District 1 where 6 doves were found dead and one sick. In Cabarrus County several birds were lost from a flock of Racing Homers during April and May. From a description of the dead pigeons, the disease is quite probably trichomoniasis.

"Only one other definite record was obtained in the annual period (July 1, 1950 - May 31, 1951). This was from Wake County on August 10. Two other probable cases occurred during July 1950; one each from Macon and Wake counties. This makes a total of 10 definite records during the annual period and 11 since the disease was first discovered in August 1949. Reports of four probable occurrences in doves were received during the annual period and six since initiation of the dove project. Altogether the definite records and probable reports add up to possibly 70-75 doves affected by the disease since July 1949. Therefore, it is concluded that while incidence of the disease is increasing, it has not as yet caused serious losses of doves in North Carolina."

South Carolina

"In recent years, since trichomoniasis became a major factor in dove mortality, an outbreak of serious proportions has been found within the state. Both sick and dead doves were found in Darlington County during the second week of April, 1951. The outbreak appeared to be confined to a small area near the town of Mont Clare. Sixty-seven (67) dead doves were found in the area and estimates of total mortality run as high as one hundred twenty-five (125). A periodic check of the area since the initial investigation has revealed a decline in the local population to the extent that only one dove was heard cooing in the area during a day of observation.

"Both sick and dead doves have been reported since February 1, 1951 rom the counties of Greenville, Chesterfield, Williamsburg, Berkeley, Lexington, Aiken, and Laurens. However, confirmation was obtained from only he last two of these counties. In each of these instances, smears taken rom the throats and crops contained specimens of the Trichomonad. In all nstances, however, no more than four sick or dead doves were reported from ny one county.

"It is the opinion of the author that the incidence of trichomoniasis as increased considerably over the year of 1950 when it was first observed."

ennessee

"Publicity concerning trichomoniasis was circulated throughout the tate several times late last summer and fall and again this spring, but very ew reports have reached this office, although I feel that the disease is resent on a much larger scale than these reports indicate."

From the above information on trichomoniasis, it is clear that no definite pattern exists in the distribution of this disease. Alabama was har est hit during 1950 and apparently the sickness is rather severe again during 1951. It would seem that an area from north to south affecting Kentucky, Tennessee, and Alabama are most severely hit by trichomoniasis. Would this i cate a spread by migration over this route? The rather severe outbreak that is showing up in South Carolina may give a hint to what will happen north and south of that state following the fall and spring migration.

The occurrence of trichomoniasis in the dove in epidemic form has created considerable interest throughout the southeast and was responsible fo several special studies to be set up in conjunction with the State Game Depar ments and the respective State University. This shows a progressive attitude on the part of the Southeastern Game and Fish administrators toward research for advancing our knowledge of game management.

5. General Recommendations

In reviewing the recommendations regarding the forthcoming hunting regulations from each state, it is evident that before sound recommendations can be submitted, data from the entire range of the Eastern Mourning Dove are needed. Even though the dove population seems to be still declining and a noticeable reduction is evident from the data presented herein, it is felt by all states that sufficient breeding birds are present on the nesting grou to bring the fall population up to the average for the past three years, provided normal production is possible. Since this condition exists, all states recommend that the season and bag limits remain the same as during the 1950- hunting season. It is recommended by some states that, if trichomoniasis or other factors materially reduce June, July, and August production, a reducti in the bag limit from 10 to 8 birds may be in order, but the 30-day season should remain the same. At the present time there is no reason to anticipat considerable reduction in production unless trichomoniasis increases in severity.

PART 2. OTHER STATES.

Information on Mourning Dove populations has been obtained by students, banders, state biologists and wardens, and Fish and Wildlife Service biologists in many states outside of the southeastern region. Comparable data or helpful information are presented from eleven states below. These show a general and consistent decrease in the dove population in 1951 from that of 1950. The causes of the decline are not clearly evident, but are probably mostly climatic. In Part 1 of this Newsletter many data are presented to show severe winter losses by storms and disease. Many northern states have reported lower populations last winter and also considerable losses from deep snows and continued severe weather. We have had no 1951 reports of cases of trichomoniasis in any northern or central states up to mid-June, although there were reports during the summer of 1950, especially from three counties in Ohio and three counties in Indiana.

An analysis of the Christmas bird censuses as published in AUDUBON MAGAZINE has been made by C. S. Robbins for 1949 and 1950. The northern eastern states reported 89.2 doves per 100 party hours in 1949 and only 75.5 doves per .00 party hours in 1950, a decrease of 15 percent. The southern eastern states reported 160 doves per 100 party hours in 1949 and 174 doves per 100 party hours in 1950, an increase of 8 percent. Since the sampling error may be as high as .5 or 16 percent, these fluctuations are not too significant. But we may point out that the 1950 count was before the severe winter weather which caused losses to the wintering population, and that the winter of 1950 was more severe than that of 1949.

The data are presented under state headings below. The coo counts were made over selected routes of twenty miles. The doves heard cooing at twenty stations at one mile intervals for three minute periods are given. The oves seen on each route include those observed while driving and also while topped. Each count began one-half hour before local official sunrise and reuired two hours.

OHIO

Intensive tests of coo-road counts were undertaken by H. S. Peters, iologist of the Fish and Wildlife Service, in Ohio during the summers of 1950 nd 1951. These counts did not begin until early June in 1950 and were continud until mid-August, while in 1951 they began on May 2 and continued until June 3. Consequently it is not proper to compare totals and averages of the central hio routes of the two years for definite populations fluctuations. A better ndication of numbers of cooing doves is gained by comparing single counts over ach route made at approximately the same dates in June of each year.

Comparison of Cooing Doves on 8 Routes in Central Ohio (mainly in Franklin County)

Route No.	Average of Counts 1951	Average of Counts 1950	Single Counts Over Route at Approx. Same Date in June 1951	Single Counts Over Route at Approx. Same Date in June 1950
5	13	16.3	16	19
6	21	19	23	13
7	19.1	16	30	11
8	17	20.3	20	24
9	14	11	15	11
10	26	26.3	21	27
11	19	22.6	15	24
12	25	22.6	25	25
Totals of Averages	154.1	154.1	Totals 165	154

1951: total of 39 coo counts was 738, averaging 18.9 doves per count.
1950: total of 29 coo counts was 549, averaging 18.2 doves per count.

Comparison of Cooing Doves on One Route in Northern Ohio (Cuyahoga County)

2	12	16	14	17

Thus, there was a slight decrease in cooing birds on this route.

Records of doves observed during the coo counts for the two summers present a different picture, since there is greater variation in the birds se than there is in the birds heard cooing. Also, it is clearly evident that th summer build-up in populations of juvenile doves was responsible for the high figures in the latter 1950 counts than during the May and June counts of 1951

Comparison of Doves Seen During Coo Counts in 8 Routes in Central Ohio (mainly in Franklin County)

Route No.	Average of Counts 1951	Average of Counts 1950	Single Counts Over Route at Approx. Same Date in June 1951	Single Counts Over Route at Approx. Same Date in June 1950
5	12.5	68.0	20	85
6	9.7	102.6	19	40
7	9.3	97	21	48
8	23	58.7	25	38
9	9	28.3	15	18
10	14.7	56	10	35
11	14	13.7	16	23
12	8.5	32.3	16	34
Totals of Averages	100.7	456.6	Totals 142	321

Comparison of Doves Seen on One Route in Northern Ohio (Cuyahoga County)

2	5	68	7	9

he difference in numbers of doves seen as compared to those heard is clearly hown from the following:

	1951	1950
No. of routes where same number of doves were seen as heard.	1	0
No. of routes where fewer were seen than heard.	34	4
No. of routes where more were seen than were heard.	4	22

Summarizing, it appears the population of cooing doves is practically he same on the central Ohio routes, but that many less doves were observed on he same routes in 1951 than in 1950.

Laurel Van Camp, Ottawa County Game Protector, who has banded large umbers of nestling doves during the past six years, writes on June 18, as ollows: "the dove population is down at least 50% in this area." His statement is based on intensive nest observations and banding of nestlings.

NEW YORK

Four coo routes in western New York were rechecked by Peters in June 951 to secure figures for comparison with counts by Duvall and Robbins over he same areas in June 1950. The following table presents the results.

Route No.	County	1951	1950
10	Niagara	20	43
11	"	20	40
12	Genesee & Orleans	20	11
13	Wayne	41	48
	Totals	101	142

This indicates a decided reduction in the number of cooing doves over hese four routes,but due to distant and faint cooing doves not being included on routes 10 and 11 in 1951 the figures show a greater apparent reduction than as actually present. There was undoubtedly only a slight decrease in the umbers of cooing individuals. Western New York evidently has a higher population of doves than does central Ohio.

PENNSYLVANIA

During June 1950 a number of coo-road counts were made by A. J. Duvall nd C. S. Robbins, biologists of the Fish and Wildlife Service. Those routes n York and Lancaster counties were rechecked by Robbins in June 1951, while eters rechecked two routes in Erie County. Following comparisons can be made:

	1951	1950
Erie County	20	23
York County	18	14
Lancaster County	20	23
	58	60

Thus, cooing doves were practically unchanged in numbers on the routes n Erie, York, and Lancaster Counties.

MARYLAND

In June 1951 Robbins rechecked a coo route in Washington County whi was originally made by Duvall and Robbins in June 1950. The trips averaged 1 in 1951 as compared to 6.5 in 1950, showing an increase over this route.

MICHIGAN

Walter F. Van Dien, of the Michigan Department of Conservation, wrc on June 25: "Mourning Doves seem to be the same as, or fewer than, they were last year with the exception of the western half of Game District 6 (in south central Michigan)."

INDIANA

W. E. Ginn, biologist of Indiana Department of Conservation, has been making roadside counts for several years in connection with his pheasant studies. Comparable data are given in the following table which he has submitted:

Comparison of the Number of Doves Observed Per 100 Miles,
By Monthly Periods, in Indiana for the Period January thru June, 1950-51

Month	Miles Traveled 1950	Miles Traveled 1951	Number of Doves 1950	Number of Doves 1951	Doves per 100 Miles 1950	Doves per 100 Miles 19
January	130	308	71	13	54.6	
February	81	227	25	8	30.9	
March	81	308	32	97	39.5	3
April	-	270	-	196	-	7
May	-	226	-	269	-	11
June	27	130	80	158	296.3	12
Totals for Period:	319	1469	208	741	65.2	5

* January and February 1951 had very bad weather when compared to the same weather of 1950.

Ginn has been making coo counts over a 20-mile route in northern Indiana (Whitley County) this year and finds an average of 34.6 doves cooing ing five counts made from March 27 to June 11. This indicates a higher popul than in central Ohio.

WISCONSIN

Fred Wagner, working on a dove problem at the University of Wiscons wrote on June 18: "There is a decided decrease this year. . . . for a radius about 35 miles from Madison. . . . . I doubt that it is greater than 50%, if much.

MONTANA

Liven A. Peterson, Fish and Wildlife Service biologist, writes: "I the vicinity of Billings doves are not as abundant."

NEBRASKA

Liven A. Peterson writes that in one study area (a small cemetery) which had the greatest nesting density in 1950 no nests were found in a recent check. However, three coo count routes in the North Loup Study Area averaged 63 doves cooing June 12 to 15. This is three times the density found on central Ohio routes.

MISSOURI

Howard M. Wight, biologist of the Missouri Conservation Commission, submitted the following table:

ANNUAL DOVE CENSUS (June 1-10)
OVER 111 SEPARATE ROUTES - 1981 MILES

Zoogeographic Region	Birds Seen Per Mile of Route					
	1946	1947	1948	1949	1950	1951
I	2.88	2.33	2.51	2.74	2.25	2.40
II	1.67	1.84	1.90	2.63	1.93	2.23
III	1.78	2.11	1.67	2.08	2.05	1.83
IV	2.26	2.23	2.18	2.46	2.06	1.92
V	2.10	2.22	2.34	2.87	2.89	2.47
VI	0.85	0.83	1.03	0.95	1.35	1.01
VII	0.91	0.81	0.76	0.70	0.99	0.71
VIII	1.95	2.23	1.52	2.14	2.22	1.49
Statewide	1.621	1.612	1.553	1.816	1.742	1.511

Six-year average, 1.642

Early morning roadside counts have been made in Boone County during 1949 and 1950 but figures for 1951 are not at hand for comparison.

TEXAS

Wendell G. Swank, completing a Ph.D. thesis on the dove at Texas A. and M. College writes (June 12); "I have found the following on the 81-acre study area here on the A. & M. campus. In 1949 and 1950 the nesting population was about the same. There were 89 active nests the first week of June on the study area those two years. This year there were only 26 active nests during this period. This is a reduction of 63% in the nesting population. I can only speculate as to the cause of this reduction, but I am confident that the severe ice storms that covered much of the wintering ground was a contributing factor."

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Federal Aid Branch
Atlanta, Georgia

MOURNING DOVE NEWSLETTER
(Not for publication)

Issue No. 5 July 30, 1951

Transactions of the Third Regional Dove Conference
July 23, 24, 25, 1951

INTRODUCTION

Ten southeastern states* have been conducting a coordinated Mourning Dove study during the past several years. Each state has been following a uniform work plan under the Federal Aid program. Annual conferences of the dove project leaders have been held and the transactions of the third conference are included herein in somewhat abbreviated form. The following persons were in attendance:

J. E. Keeler, Dept. of Conservation, Montgomery, Ala.
F. A. Winston, Game and Fresh Water Fish Comm., Tallahassee, Fla.
O. E. Frye, Jr., Game and Fresh Water Fish Comm., Tallahassee, Fla.
Dan Nelson, Game and Fish Comm., Atlanta, Ga.
Jack Crockford, Game and Fish Comm., Atlanta, Ga.
Bob Cannon, Game and Fish Comm., Athens, Ga.
Eugene P. Odum, University of Georgia, Athens, Ga.
J. H. Jenkins, University of Georgia, Athens, Ga.
Milton Hopkins, Jr., University of Georgia, Athens, Ga.
T. A. McGowan, University of Georgia, Athens, Ga.
Dan M. Russell, Div. of Game and Fish, Bowling Green, Ky.
Wm. T. Skaggs, Div. of Game and Fish, Frankfort, Ky.
G. R. Healy, University of Kentucky, Lexington, Ky.
J. D. Newsom, Dept. of Wild Life & Fisheries, Shreveport, La.
J. B. Kidd, Dept. of Wild Life & Fisheries, Shreveport, La.
Henry Bobbs, Jr., Game and Fish Comm., Jackson, Miss.
Don Allison, Wildlife Resources Comm., Raleigh, N. C.
Harold B. Poole, Game and Fish Dept., Columbia, S. C.
J. W. Hammond, Game and Fish Comm., Nashville, Tenn.
Al Hyder, Game and Fish Comm., Nashville, Tenn.

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NOV 13 1951
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J. C. Howell, University of Tennessee, Knoxville, Tenn.
A. J. Meyerriecks, University of Tennessee, Knoxville, Tenn.
Alexander Sprunt, IV, Virginia Cooperative Wildlife Research Unit, V. P. I., Blacksburg, Va.
M. H. Markley, Fish and Wildlife Service, Washington, D. C.
C. E. Lowe, University of Georgia, Athens, Ga.
Leonard E. Foote, Wildlife Management Institute, Marietta, Ga.
Geo. C. Moore, Fish and Wildlife Service, Atlanta, Ga.
H. E. Wallace, Fish and Wildlife Service, Atlanta, Ga.
C. W. Watson, Fish and Wildlife Service, Atlanta, Ga.
Harold S. Peters, Fish and Wildlife Service, Atlanta, Ga.
Walter A. Gresh, Fish and Wildlife Service, Atlanta, Ga.

The conference was called to order at 9:45 a.m., July 23, at the Toccoa Wildlife Experiment Station in the mountains of northern Georgia. George Moore outlined the general procedure to be followed. He briefly reviewed the two previous meetings and gave a statement on the aims that would be followed during the duration of the meeting. He emphasized that we must keep in mind at all times the application of our recommendations, or the time spent by project personnel would be wasted. It will be left up to the state administrators to follow through with the recommendations made by this project; therefore, they must be workable, cheap, and effective.

CENSUS TECHNIQUES

Coo Counts:

George Moore briefly explained the standardized coo count which has been followed in all states and outlined the intensive work which is being conducted at the University of Georgia and University of Tennessee. He then called upon Dr. Eugene Odum of the University of Georgia, who presented a summary of the intensive and extensive cooing counts which have been conducted over an experimental route at Athens, Georgia, for the past five months. Dr. Odum's summary was made in graphical form, which was incomplete since the check of the cooing count will be continue into September. The results so far indicate that the intensive morning counts made concurrently by five crews and repeated at monthly intervals showed a relatively uniform result from one-half hour before official sunrise to one-half hour after sunrise and a drop in coo intensity during the period from one hour to one and one-half hours after sunrise.

The intensive evening counts made in the same manner indicated relatively uniform cooing intensity from two hours before sunset until sunset, but only one-half to one-third as many individuals were heard. Beginning in March, counts were made at least once each week in the morning and in the evening by Terry McGowan over the same experimental route. His morning counts showed an increase in the number of birds cooing, beginning about the third week of April and leveling off into a rough plateau from early May until the third week of June. Evening counts show a similar pattern at about one-third the intensity. Climatic factors were considered in analyzing the counts, but have not been completely studied and are therefore inconclusive at this time.

Doves seen during the coo counts were much more variable then the number of birds heard.

Harold Peters then presented a summary of combination coo-road counts which had been made for the last two years in central Ohio, and presented a tabular summary of the intensive counts that he had made on two routes in this area during May and June. A summary of these counts was included in Newsletter No. 4.

Project leaders in the ten southeastern states have been making coo counts on two routes in each ecological zone in their state at monthly intervals. The conclusion reached was that data gathered through the intensive checks at the University of Georgia and the University of Tennessee will be analyzed and combined with data gathered in the ten states by the project leaders, in order to suggest a standardized method for a cooing breeding census. These data will be presented to all dove project leaders present at the Southeastern Wildlife Conference at Biloxi, Mississippi, in October. The summary is being prepared, not only to suggest a standardized coo count method, but to determine whether the coo counts will give an index to the breeding population which would be comparable in different parts of the dove's range.

There was some discussion about sex and age of birds heard cooing and it was decided that any dove's vocal sound which could be distinguished would be counted as a cooing bird.

Breeding Study Areas:

Breeding study areas have been run for two years in the Piedmont and Coastal Plain sections of Georgia and for one year by the ten project leaders in conjunction with coo counts. Odum and Hopkins, at the University of Georgia, have found the breeding population to be related to the forest edges, especially where a peninsula of coniferous forest type extends into farm land or other vegetative types. Populations in the Coastal Plain of Georgia ranged from one to six pairs per 100 acres. A depression was found in mid-summer in the Coastal Georgia breeding population, while no such depression was noted in areas studied in the Piedmont.

There was considerable discussion of nest mortality. Dr. Odum suggested the so-called density theory to account for the increased success of colonial nesting doves. He thinks there may be an optimum density for breeding success. Henry Bobbs, from Mississippi, indicated that 80 percent of 57 nests have been successful so far this year in one of the concentrated nesting colonies in the Delta section of that state as compared to a 64 percent success of over 400 nests in the same area last year. There was discussion of the effects of weather on production and the effects of predators such as Blue Jays on production. Dr. Howell, at the University of Tennessee, reported that their breeding study area, being run in conjunction with the Tennessee coo count route, is a square mile in area. While he felt that an area of this size was exceedingly difficult to census by the spot-mapping method, a smaller area would not include all potential cooing birds. We need more area counts which can be correlated with coo counts over several years in order to determine whether a count of cooing individuals gives a reliable index to the breeding population. This type of study is best adapted for universities rather than project leaders.

Road Counts:

Random. -- The type of random road counts which have been conducted varies from state to state, some being taken solely by the dove project leader, some by P-R technicians, and some by endorcement officers. Many miles of random counts are necessary to show fluctuations in populations. It was brought out that a project leader cannot secure the necessary information solely from his own driving. Several thousand miles per month would be required to give a near-accurate figure on populations fluctuations. Since random counts by technicians or others require little or no additional expenditure of funds, these should be continued throughout the year for each state. At present we do not know how many miles of random road counts are necessary to secure a significantly accurate appraisal of dove populations at different seasons of the year; so, it was decided to continue the random road counts on the same basis as in the past. All project leaders are to send all raw random and controlled road count data to Dan Nelson for statistical analysis. Nelson will report on this at the Southeastern meeting in October.

Controlled. -- Periodic counts have been made over selected routes by each state. Preliminary analysis of these generally showed the same trend as random counts, consequently, many project leaders wished to discontinue them. However, most states will continue the controlled counts pending analyses of their raw data by Nelson and his subsequent report at the Biloxi meeting.

Mail Carrier Census:

Winter rural mail carrier censuses were made in six states in 1950 and 10 states in 1951, with re-checks in two states because of bad weather in 1951. It was evident from the discussion that there was little value in a winter rural mail carrier census as an index to the population which would be available to the hunter the following fall. It was decided to table decision about continuing the winter rural mail carrier census until the Biloxi meeting. Some project leaders suggested changing the carrier census to July in order to secure a production index. The point was brought out, however, that any census must be made in such form that it will be continued annually without change at the conclusion of the present dove projects. It was felt that the analyses of rural mail carrier censuses might take too much time to be immediately available for regulations purposes.

In order that we may secure the latest production data available before regulations, it was decided to contact the Regulations Committee to determine the latest possible date the information should reach them to be considered in the regulations. As late as the first week of August would be preferable.

BANDING

There was some discussion on the size of dove bands in an effort to secure a higher percentage of recoveries. Since most of the project leaders have used only 3-A bands they were not prepared to discuss the relative value of 3 versus 3-A size bands. However, Frank Winston reported that two of his orange-dyed doves from Apalachicola were recovered minus bands. This is quite alarming since only ten of the 157 dyed birds were handled, indicating that 20 percent may have lost bands. This may indicate an important source of lost bands and a major cause for the low percentage of dove recoveries.

The project leaders agreed that the band should be re-designed at once to include "Washington, D. C." on the outside. Perhaps an experiment could be run when a concentration permitted banding many doves in a short interval, such as is now being done at West Palm Beach, Florida. If a size 3 band were put on one leg and a size 3-A were put on the other leg, some information could be secured of the possible loss of bands.

A recent memorandum from the Washington office of Fish and Wildlife Service, requesting that all persons banding doves under the master permit in each state secure sub-permits from Washington, provoked considerable discussion. The names and addresses of all banders should be sent to Washington for issuance of sub-permits. In case of emergency, a telegram addressed to the Branch of Game Management, Fish and Wildlife Service, Washington, D. C., would receive telegraphic approval for such banding.

The two analyses of recoveries of banded doves which have been prepared are not sufficiently detailed to give the project leader information on movements of birds from or into parts of their states. Consequently, more detailed analysis should be made in the near future from the banding records at Patuxent Refuge of both direct and indirect returns to the counties of the states. This analysis is being planned by Peters during the coming winter and will be distributed to each project leader.

Preliminary study of these recoveries indicate that some population segments should receive intensified study by banding during the fall migration. Frank Winston told of his studies at Apalachicola, Florida, from late September until mid-October 1950, when he banded and colored 157 doves. Eleven of these were recovered and 12 were observed. This indicates the information which might be obtained from similar segment banding and dyeing of doves. Consequently, it was decided that Kentucky will use purple dye in marking doves in the southwestern part of the state in late summer until the hunting season. Tennessee will use a red dye on birds trapped at the Shelby County Penal Farm near Memphis. Mississippi will use a blue dye to mark birds caught in the Parchman area while Louisiana will color doves with a green dye, especially in the western part of the state. Publicity will be necessary to acquaint the hunters of these and adjoining states with the program, in the hopes that additional information will be secured on the southwar movements through the Mississippi Valley states and into eastern Texas. Florida will continue to use the orange dye at Apalachicola. The other states will not use this coloring method until population segments are discovered which would lend themselves to this method of study.

It was decided that banding of nestling and flying doves will be continued in various parts of each state when doves are available in sufficient numbers and that additional publicity be used to induce hunters to report recoveries of banded doves in larger numbers. Dove trapping and banding will be conducted by Peters and Seth Low in Ohio and Indiana during August, and banders in other states outside of the southeastern region should be asked to intensify their dove banding.

PRODUCTION STUDIES

Each of the southeastern states has been examining doves in hunters' bags to determine the adult-juvenile ratio, the approximate age of juveniles and the percentage of the adults still feeding young at various times during the hunting season. The project leaders agreed that this method of determining the adult-juvenile ratio should be continued during the coming hunting season.

Trained and experienced banders might determine the adult-juvenile ratio at various times during the year and also may tentatively age the juveniles caught in their traps, by recording the number of juvenile primaries remaining in one wing. The rate of molt could be determined by re-trapping the same doves. This information is needed from several sections to refine our aging technique and to determine whether the molt progresses uniformly in both wild and caged birds.

A study of late summer flocking and migration might be made by project leaders and banders. Study areas will produce needed information on production and nesting success to correlate with the information secured from examining doves in hunters' bags.

HUNTING EFFECTS

Most of the states have been attempting to measure hunting pressure from examination of hunters' bags as well as through some form of questionnaire. It was decided that each state not now having such a study in progress should determine hunting pressure and kill by a questionnaire which should be sent out to all hunters or to those known as dove hunters. Each project leader was asked to consult a statistician in his state to determine the method and size of sample needed in securing this information. A return postcard type of questionnaire asking simple questions was considered best. These might be:

1. Are you a dove hunter?
2. How many times did you hunt doves last season?
3. How many doves did you kill last season?

Most states wish to have information on the crippling loss of doves, but the leaders agreed that they should not seek further information on the number of shots fired in dove hunting.

MORTALITY

Andrew Meyerriecks of the University of Tennessee and Alexander Sprunt, IV, of the Cooperative Wildlife Research Unit, Virginia Polytechnic Institute, discussed trichomoniasis and told of the instructions they had received from Dr. Carlton Herman of Patuxent Research Refuge. It is important to secure an index to the incidence of this disease in doves at different points throughout the range of the species. This can be determined by making swabs from the upper digestive tract and mouth of doves of any age. This material can be examined immediately with a microscope or can be cultured in a saline solution - egg albumen culture. Usually the disease can be diagnosed by the presence of yellowish lesions in the mouth or throat, which may be from pin head size to large bumps. However, some doves may be carriers and produce a positive slide or a culture from slides when no lesions are visible. Alabama, Kentucky, Tennessee, and South Carolina are now studying, or will soon begin to study, this disease. So far, no treatment or cure is known for trichomoniasis, although it can be treated in domestic poultry by using one part of copper sulphate to 2,000 parts of water for drinking. The disease cannot be diagnosed in doves which have been dead more than an hour or two. Consequently, there is nothing to be gained by shipping dead doves to a laboratory, except that visual lesions would sometimes indicate the presence of the disease.

There have been some reports of doves killed by insecticides or fungicides applied to various plants. Studies are now being conducted at the Alabama Cooperative Research Unit to determine the toxicity of various chemicals and poisons. Any report of such occurrences in the field should be carefully investigated and a definite count made of birds affected. Doves are known to pull up germinating plants occasionally and may cause local damage. This type of damage becomes serious in selected crops, and control may be responsible for killing many doves. John Newsom believes that mortality, due to poison for the purpose of protecting crops, may equal the annual kill by legal hunting in that state.

During the past winter considerable mortality was occasioned by the severe cold, which extended from Kentucky through Tennessee, Mississippi, and Louisiana to eastern Texas. Possibly 25 percent of the birds present in some areas were reported dead from this cold. Evidently they were unable to obtain food from ground covered by snow or ice for several days. Some were found with empty crops in barns and hog shelters next to corn and other foods which they did not eat.

FOOD HABITS STUDIES

Some of the project leaders have gathered dove crops in an effort to determine the kind and quantity of food consumed at different times in various sections of their state. Since the number of such crops gathered is not very great in any state, it was decided that they might all be sent to one project leader for analyses by a graduate student. Food habits studies are of minor importance in connection with the southeastern dove study.

PUBLICATION

At the conclusion of each state's dove study, a complete report of the work done in that state can be published, if the state wishes. Perhaps, a complete treatise on the Mourning Dove can be compiled by all project leaders at the conclusion of the entire study. This might be in the nature of a monograph on the Mourning Dove, possibly, financed by the Wildlife Management Institute.

The project leaders were requested to mail reprints of any articles they write, or which might otherwise appear in their State Game Department publications, to Peters, in order that they can be abstracted for distribution to all dove workers. The two sets of abstracts already distributed have been of some assistance in connection with reports and graduate studies.

RECOMMENDATIONS

Recommendations will be made after all data have been analyzed and presented to the Southeastern Directors at their fall meeting on October 22, 23, and 24, 1951.

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U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
50 Seventh St., N. E.
Atlanta 5, Georgia

ssue No. 6 June 30, 1952

MOURNING DOVE NEWSLETTER
(Not for Publication)

This issue constitutes an up-to-date summary of the dove population and has een prepared to furnish information to the states and the Fish and Wildlife Serice in promulgating the dove hunting regulations. The information contained is ot for publication or citation. The conclusions are placed first for ready perusal.

Conclusion

During 1951 there was a considerable gain in the overall population to halt he decline that started in early 1950. Call counts made during 1952 in most of he states east of the 100" meridian show a breeding population little changed rom that of 1951. It is too early to tell the effect of the present breeding eason on the fall population but numerous project leaders in the southeast report good number of juveniles at trapping stations.

The coordinated efforts to secure information on breeding populations have roduced results since 601 counts have been made on 197 routes during May and June f 1952.

The best information available to date indicates that the fall population hould be slightly greater than that of 1951, however, this is dependent upon uccessful nesting during the remainder of the 1952 season.

Population Trend

The dove population started on a decline in 1950 and probably reached the ow in the spring of 1951. Production was extremely poor in 1950 but approached ormal in 1951. The 1951 fall population, therefore, was somewhat better than in 950 but far short of the 1948-49 figure.

Random road counts (Table III) give data for the 10 southeastern states.

Hunter bag checks (Table II) show that the 1950 breeding population roduced fewer young than in 1951, and the reduced juvenile percentage in 1950, ombined with a decrease in the kill per gun hour during 1950, also indicated oor production that year. In 1951 a smaller breeding population, with better roduction, resulted in a slight increase in the 1951 kill per gun hour.

Summary of Call Counts

a. Routes Censused in 1951 and 1952 - Comparable Data.

Comparable data from 57 call count transects in Alabama, Georgia, lorida, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and

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Tennessee on routes which were run during both 1951 and 1952 show a 4.1% increase in calling birds during 1952. Additional data from 18 transects, of a comparable nature, is available from Virginia, Illinois, Indiana, Wisconsin, Maryland, Missouri, Nebraska, New York, North Dakota and Pennsylvania and indicate a 10% decrease in the calling population. In Ohio the results of [illegible] transects showed approximately the same calling population in 1952 as in 1951.

Routes run in Alabama where Trichomoniasis was severe in 1950 and 1951 show recovery, with the 1951 routes averaging 13.8 doves per route as compared to 20.1 doves per route in 1952.

Routes in the Delta area of Mississippi, in west Tennessee, and Kentucky, the areas hardest hit by the severe weather in February 1951, also indicated good recovery of the population.

Elsewhere in the southeast, populations of calling doves showed spotty improvement, with declines in some areas in part due to changes in the agricultural pattern. More birds were heard calling on routes in Florida and Louisiana with fewer birds noted in South Carolina.

b. Routes Censused in 1951 and 1952 - All Routes.

A grand total of 93 call count routes were run during 1951 in the 11 southeastern states, yielding an average of 15.5 doves per 20 station route. During 1952, 95 call count routes were run in the 11 southeastern states averaging 21.4 calling doves per 20 station route.

An additional 38 routes were run outside the southeast during 1951, yielding an average of 21.3 doves per 20 station route. During 1952, 102 routes were run outside the southeast, averaging 24.9 doves per route.

c. Statistical Comparison.

As will be noted from Table I, the number of dove call count samples has increased during 1952, mainly by voluntary cooperation of state technicians, U. S. game management agents, and interested individuals. Through these efforts, a somewhat better distribution of sample routes over the breeding range of the Mourning Dove east of the 100" meridian has been obtained in order to include both marginal and well populated parts of the breeding range. Data gathered in 1951 were chiefly obtained from the southeastern states and, therefore, the following statistical analyses of 1951 and 1952 data are not strictly comparable (1952 figures based on reports received early enough to permit analysis):

Year	No. Routes	Avg. Doves Per Route	Standard Deviation	Standard Error	% Reliability 95% of Time	Relative Variation
1951	101	15.65	10.25	1.02	13.0	65.5%
1952	166	21.20	13.24	1.03	9.5	79.7%

The 1952 results, however, show that if the sampling of 176 routes as proposed from the 1951 data (Table I) can be followed in future years by annual censusing of the same routes, it will be possible to denote significant changes of 10% or less in the calling dove population as related to land area.

Migration and Hunting

Trapping and banding data indicate that migration starts in July and by eptember 1 most locally raised birds have moved southward. There seems to be a eek or two differential between the movement of birds along the Atlantic coast nd those down the Mississippi Valley region, the latter being earlier. Banding nd return data indicate that there are four general population segments. Most of he local breeders and their offspring have moved southward by September 1. Over- apping and immediately following the southward movement of locally raised birds re the early migrants from farther north. These migrants pass through the more orthern Region IV states during September. The third segment is made up of the ate migrants appearing in the most southern states in November and remaining hroughout the winter. They are later joined by the earliest migrants starting he northward migration.

These segments give rise to a desire to hunt when the birds are most bundant. Since the peak of this southward movement is in August and consequently asses through Kentucky, Tennessee, Arkansas, Virginia and some of the northern arts of other states by September 15, many hunters advocate early hunting. The ovember and December migration has little effect on the population in the above- entioned states as the birds seem to move through without stopping.

Disease and Weather

Apparently trichomoniasis reached its intensity during 1950. Locally, the isease was severe during 1951 but reports during the present year are few. This isease seems to have been most severe in Alabama and the greatest reduction in he population occurred in that state. Reports from Alabama indicate a good ecovery.

The severe snow and ice storm that hit Louisiana, Mississippi, Tennessee, entucky, Arkansas and Texas in February, 1951, caused considerable damage to the ove. It is believed that the effect was mostly local and was confined to the opulation segment made up of local breeders in Louisiana, Mississippi, Tennessee, nd Kentucky. Reports from these states indicate that the breeding population is uch better in 1952 than in 1951.

Cooperation

The data presented in this newsletter were secured by cooperative effort n 33 states as shown in Table I. This excellent assistance from technicians, tudents, game agents, and others has provided the most widespread information on he breeding population of doves ever assembled. While the proposed number of outes were covered in only half the states this year and some counts were not ade according to standardized suggestions, we hope that 1953 may see an even etter cooperative effort toward an annual census. The random road counts and ther bag checks were conducted by biologists, wardens, and game agents in the outheastern states in connection with their intensive dove study.

This issue was compiled by George Moore and Harold Peters, Fish and Wildlife ervice; Leonard Foote, Wildlife Management Institute; and [illegible], Georgia ame and Fish Commission.

eproduced December 1956

Table [illegible]

Number of Dove Call Count Routes Covered During 1951 and 1952

	1952		1951		Routes		1952		1951		Routes
tate	No. Routes	No. Counts	No. Routes	No. Counts	Desired Sample	State	No. Routes	No. Counts	No. Routes	No. Counts	Desired Sample
la.	8	23	10	20	7	Mont.	1	1			
k.	2	6	4	8	7	Nebr.	4	11	1	[illegible]	[illegible]
nn.					1	N. J.	3	9			1
la.	1	3			1	N. Y.	4	4	4	4	7
la.	9	30	10	20	8	N. C.	7	21	6	11	6
.	21	53	10	43	8	N. D.	2	5	1	2	4
la.	4	10				Ohio	15	[illegible]	15	[illegible]	[illegible]
l.	2	8	1	6	7	Okla.	5	17			6
d.	4	13	1	3	5	Penna.	5	19	2	3	6
owa	3	7			7	S. C.	9	30	8	16	4
n.	7	21			5	S. D.	5	12			5
y.	7	21	11	21	6	Tenn.	11	32	12	28	6
a.	7	21	13	26	5	Texas	7	21			10
l.	3	10	3	18	2	Utah	1	3			
ss.					2	Va.	5	15	2	12	5
ch.	6	25	1	2	4	W. Va.					2
nn.	4	8			7	Wisc.	7	17	[illegible]	[illegible]	[illegible]
ss.	9	37	8	16	6						
.	8	23	5	42	9	Total	197	601	133	365	175

TABLE II - BAG CHECK DATA SUMMARY - 1949-1952 HUNTING SEASONS

State		Period	No. of Doves			Percent Juveniles			Kill Per Gun Hour		
			1949-50	1950-51	1951-52	1949-50	1950-51	1951-52	1949-50	1950-51	1951-52
Alabama		Dec. 17 to Jan. 15	322	242		12	18.6		1.25	1.4	
Arkansas		Sept. 16 to Oct. 15	492	104	103* 186/	65	77	65* 55/		1.7* 3.4/	
Florida		Oct. 1-30** Dec. 17-Jan. 15	406 774	418	535	72.7 21	69.0	82.7	1.0 2.3	0.7	1.21
Georgia	State-wide	Sept. 16-30 Jan. 1-15	1345			55.2			2.75 1.6		
	No. Ga.	Sept. 16-30 Jan. 15-31			534 26			72.2 26.9			1.84 1.54
	So. Ga.	Sept. 16-30 Jan. 15-31			722 435			74.7 6.1			1.72 1.82
Kentucky		Sept. 1-30	888	1129		65.5	65.1		1.5* 1.9/	1.3* 1.6/	
		Sept. 16 Oct. 15			443			73.6			0.9* 1.4/
Louisiana		Dec. 1-30	424	469	725	42.5	35.4	35.4	1.3	1.8	1.7
Mississippi		Sept. 16-30	1996	1044		69.2	64.6			1.8	
North Carolina		Sept. 16-30	706	1943	962	73.2	60.3	52.5	1.8	1.5	1.0
South Carolina		Sept.	108	4	480* 1051⁂	69.5		75 69.3⁂			1.75
Tennessee		Sept. 16-30 Oct. 1-30	465 302	1542 304	1679 177	69.5 75.2	57.3 52.0	73 74	1.9	1.6	1.3 1.2
								Average	1.71	1.44	1.55

* Biologist bag check ** So. Fla. (3 counties)
/ Warden bag check ⁂ Wings as identification

TABLE III

Summary of Random Road Counts in Southeastern States for April, May, and June of 1949, 1950, and 1951. June 1952 data are incomplete

	1949		1950			1951		1952	
	Mile	D/100 mi.	Mile	D/100 mi.		Mile	D/100 mi.	Mile	D/100 mi.
April	1563	7.8	1451	10.4		4003	4.7	8212	3.53
May	2685	10.1	2300	7.6		6214	6.5	11021	5.79
June	2231	17.7	1900	8.8		2412	7.8	-	-
April	790	16	1700	11.6		936	4.2	-	-
May	873	12.6	832	15.5		1679	8.2	-	-
June	1563	10.2	-	-		814	5.	-	-
April	-	-	2276	5.6	S.Fla.	7474	26.7	3671	34.9
					N.Fla.	5146	21.1	2954	25.6
May	-	-	-	-	S.Fla.	7760	13.8	5008	30.7
					N.Fla.	5466	11.4	3241	18.6
June	-	-	-	-	S.Fla.	-	-	5237	16.0
					N.Fla.	-	-	5867	13.9
April	-	-	1298	7.7		3477	5.28	4016	3.54
May	-	-	1003	7.18		2787	3.84	5964	5.72
June	-	-	731	4.1		2436	5.34	2881	7.46
April	-	-	-	-		342	4.09	3400	5.00
May	-	-	-	-		5065	4.83	3300	6.67
June	-	-	-	-		2670	4.45	-	-
April	-	-	1647	9		7239	2.8	10978	1.9
May	-	-	1279	14		9348	7.9	8267	5.4
June	-	-	530	10.9		3652	8.4	12604	7.1
April	3049	46.6	219	19.2		1097	9.8	1576	10.8
May	3167	21.9	208	21.6		1345	6.1	1537	12.6
June	-	-	-	-		-	-	581**	21.6
April	-	-	1584	2.1		12838	4.5	11689	3.6
May	-	-	1504	4.1		12977	8.0	11932	4.2
June	-	-	1074	1.9		3645	10.5	13954	6.2
April	-	-	-	-		1455	5.01	6447	3.74
May	-	-	-	-		2036	6.53	4143	13.53
June	-	-	-	-		415	9.87	-	-
April	20586	14.3	1383	14.5		7036	5.2	602	9.5
May	26336	19.5	1340	21.9		6984	8.4	1243	12.9
June	8662	23.8	1070	26.9		2244	11.4	1029	20.3

orida random road count data not strictly comparable from year to year.

June 15 only.

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SUPPLEMENT

To MOURNING DOVE NEWSLETTER, No. 6, June 30, 1952

Details of the Mourning Dove call counts which were summarized in Table 1 of the Newsletter are given in the following pages of this Supplement. These are listed by states and counties to show the number of times each route was covered in 1951 and/or 1952. The average number of doves heard on each route during the counts in May and June is given. When counts were made over the same route in both years the figures are on the same line. These are comparable counts, as they show the average number of calling doves for the two years. In some states counts were made in both years, but not over the same routes so comparison is not possible. Since proper management of Mourning Doves must be based on a knowledge of populations from year to year, it is desirable to cover the same routes at approximately the same dates each year. We hope that most of the 1952 counts will be repeated during May and early June of 1953. Cooperators should indicate whether 1953 counts are over routes covered in 1952 (and earlier) and give the results of previous counts for comparison. This will insure ready summarization and tabulation when the records are sent to the Atlanta office.

The persons who made the 1952 call counts are listed under each state heading. In some cases where the counts were not made in accordance with standardized instructions, especially as regards starting one-half hour before sunrise, we were unable to include and utilize the results in this summary. Likewise, if the completed forms were not in the Atlanta office by the requested date of June 25 they are not included. We regret the necessity for this deadline, but a complete summary and analysis of all call counts had to be prepared for the information of the states and the Washington office of the Fish and Wildlife Service for their use in promulgating the dove hunting regulations by June 30.

The 1952 dove call count was truly a cooperative project, for over 150 biologists, students, wardens, and sportsmen from 33 states submitted the results of their counts made according to standardized techniques. We believe this type of count provides a satisfactory index to the population of nesting doves, and that annual counts made over the same routes will enable the states and the Fish and Wildlife Service to denote fluctuations in numbers for proper management.

The splendid cooperation of the many persons listed has made this joint project a success, and we wish to thank everyone who participated.

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es E. Keeler, Bernes Pugh, W. B. Traylor, Robert E. Waters, Pat W. Close

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
oastal #1	2	19.5			Baldwin (L.C.)			28.0	3
oastal #2	2	22.0			Montgomery(U.C)			28.7	3
ckbelt #1	2	19.5			Houston (U.C)			28.6	3
ckbelt #2	2	4.5			Tuscaloosa (U.C)			10.7	3
oastal #1	2	7.0			Colbert (U.C.)			8.0	3
oastal #2	2	4.0			Randolph (Piedmont)			12.7	3
dmont #1	2	4.0			Tallapoosa (Piedmont)			4.0	2
dmont #2	2	8.0			Montgomery			40.3	3
estone V.#1	2	31.0							
estone V.#2	2	19.0							

ANSAS

B. Mebane, Ralph Hartman, Jr., P. J. Von Huizen

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
rk Region	2	3.0			Arkansas			19.0	3
ta Region	2	10.0			Craighead			14.7	3
chita Reg.	2	2.0							
stal Plain	2	0.0							

AWARE

man G. Wilder

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
t			20.6	3					

RIDA

nk A. Winston, M. F. Hudson, J. W. Wolfley

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
eola	2	21.0	29.0	3	Washington	2	28.0	3.0	3
k	2	11.0	17.0	3	Leon	-	-	19.3	3
rlotte	2	4.0	20.2	5	Levy	2	11.0	2.3	3
hlands	2	11.0	-	-	Lafayette	-	-	21.0	3
e	2	12.5	21.5	4	Wakulla & Franklin		-	20.7	3
m Beach	2	7.0	-	-	Polk	-	-	10.0	3
ison	2	14.0	-	-					
ion	2	11.0	-	-					

RGIA

Nelson, John Connell, Terry McGowan, Walker Harrod, Wm. R. Edwards

	1951		1952			1951		1952	
ty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
en	2	2.5	1.0	3	Dooly			35.5	2
des	2	17.0	5.7	3	Washington			25.0	1
tur	2	11.0	16.3	4	Walker			23.0	1
och	2	25.0	21.0	3	Franklin			38.5	2
ens	2	20.0	21.3	3	Taylor			7.0	1
ding	2	13.0	18.0	3	Bartow			27.5	2
oln	1	14.0	15.3	3	Union			5.5	2
ee (AM)	15	27.3	22.6	7	Coffee			3.0	1
(PM)	14	7.2	7.5	6	Randolph			20.0	1
e	1	29.0	43.0	1	Wayne			0.0	1
ham & Bryan			3.7	3					

O

n Fichter

	1951		1952			1951		1952	
ty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
ham			6.8	5	Bannock			11.0	2
r			17.0	2	Caribou			7.0	1

NOIS

. Kossack, L. R. Pietsch

	1951		1952	
ty	#Count	Avg.	Avg.	#Count
& Lake	6	5.0	8.0	5
			2.3	3

ANA

. Ginn, John M. Allen, D. M. Brooks, M. C. Reeves

	1951		1952			1951		1952	
ty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
ley	3	32.3	20.0	3	Jasper & Pulaski			16.0	4
ricks			15.3	3	Daviess			28.3	3

. Walsh, L. C. Fleming, John McSweeney, K. C. Brabham

	1951		1952			1951		1952	
ty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
			49.7	3	Bremer & Fayette			5.7	3
ebago			29.0	1					

SAS

. Ramsey, T. S. Robinson

	1951		1952	
ty	#Count	Avg.	Avg.	#Count
.			25.6	3
wick			36.0	3
on			24.3	3
gomery			13.3	3

	1951		1952	
County	#Count	Avg.	Avg.	#Count
Saline			50.6	3
Shawnee			22.6	3
Barber			5.3	3

UCKY

Russell, R. C. Soaper

	1951		1952	
ty	#Count	Avg.	Avg.	#Count
es	2	18.0	19.0	3
stian	2	14.5	17.0	3
erson	2	18.5	19.0	3
			10.0	3
e	2	23.0	15.0	3
t	2	14.0	20.7	3
	2	11.0		

	1951		1952	
County	#Count	Avg.	Avg.	#Count
Jackson	2	4.5	4.7	3
"	2	0.5		
Adair	2	18.5		
Hickman	2	22.5		

SIANA

Newsom, J. B. Kidd, Charles V. Carlton, Richard L. Barnes

	1951		1952	
ty	#Count	Avg.	Avg.	#Count
iss. oodplain	2	7.0		
"	2	10.0	4.7	3
rie	2	3.0	4.0	3
"	2	3.0		
Hwd. east Miss. R.	2	9.5	7.0	3
"	2	3.0		
n	2	0.0		
"	2	6.0		

	1951		1952	
County	#Count	Avg.	Avg.	#Count
N. La. Hwd. uplands	2	7.5		
" "	2	17.0		
Cutover long-leaf pine	2	3.5	22.0	3
U. Miss. floodplain	2	18.0	23.3	3
" "	2	28.0		
Rapides & Allen			21.0	3
Ouachita			25.3	3

LAND

J. Duvall

	1951		1952	
Y	#Count	Avg.	Avg.	#Count
s Georges	9	9.3	13.7	4
d	8	15.8	13.0	3
ngton		10.5	11.0	3

HIGAN

P. Davey, Irene F. Jones, N. L. Cuthbert, Joseph Vogt, P. T. Robinson, J. E. Mull

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
ntenaw #1			18.0	5	Kent			23.5	4
ntenaw #2			23.7	4	Saginaw	2	24.0		
oella #1			3.0	5					
oella #2			2.8	5					

NESOTA

R. Alexander, M. L. Stirrett

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
crami			7.5	2	Jackson			57.0	2
c & ed Lake			43.5	2					

SISSIPPI

ry Bobbs, Jr., Joe Lanier, John H. Phares, N. C. Hutcheson, B. C. Lundy,
n Starkey, John Jackson, H. R. Redmond

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
aquena	2	3.0	14.6	5	Rankin	2	23.5	31.2	5
aquena & arkey	2	5.0	15.8	5	Marion	2	28.0	33.3	3
ren & Yazoo	2	6.5	16.4	5	Stone	2	20.0	20.0	3
ayette	2	8.0	2.7	3	Madison & Hines			5.7	3
ctaw & nston	2	20.5	8.2	5					

SOURI

Wight, R. G. Stockton, A. P. McCormick, Lee Crain, J. A. Stanford, K. C. Sadler,
T. Maschmann, R. L. Glesenkamp

	1951		1952			1951		1952	
ty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
e	9	26.8	37.6	3	Greene			22.0	3
well			15.6	3	Cape Girardeau	10	30.7	33.6	3
Charles			18.3	3	Clinton	7	44.8		
iton			24.3	3	Lawrence	9	40.5		
away			30.0	2	Shelby & Monroe	7	39.7		
ll & uglas			10.7	3					

TANA

V. Rounds

ty	1951 #Count	Avg.	1952 Avg.	#Count
lowstone			33.0	1

RASKA

M. Gates, W. E. Eigsti, Calvin Klein, L. M. Moos, Phil Agee

ty	1951 #Count	Avg.	1952 Avg.	#Count
s			17.0	2
easter	6	35.1	47.6	3
& Lancaster			76.0	3

JERSEY

. Bevan and E. Tomlin, R. A. Spinks, G. Harvard

ty	1951 #Count	Avg.	1952 Avg.	#Count
erland			4.3	3
ex			5.6	3
erdon			6.0	3

YORK

. Peters, A. S. Taormina, Don Spittler, Robert Cottrell

ty	1950 #Count	Avg.	1951 Avg.	#Count	1952 #Count	Avg.
ara #10	1	43.0	20.0	1	1	20.0
ara #11	1	40.0	20.0	1	1	17.0
see & leans #12	1	11.0	20.0	1	1	17.0
e #13	1	48.0	41.0	1	1	18.0

TH CAROLINA

ald G. Allison, George J. Ross, Sam F. Poole, C. B. Woodhouse, T. R. Mitchell,
). Halstead, S. D. Fitze, Ben H. James, Rex L. Bird

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
e	2	18.5	17.7	3	Macon	2	4.0	9.3	3
idson	1	24.0	21.3	3	Watauga	2	0.5		
nston	2	14.0	23.0	3	Robeson			31.3	3
t	2	13.0	29.7	3	Cabarrus			43.3	3

TH DAKOTA

I. Randall and Madden, F. A. Cunningham

	1951		1952	
nty	#Count	Avg.	Avg.	#Count
leigh			42.0	3
ville	2	34.5	29.5	2

)

S. Peters, Floyd Chapman & Wildlife Division biologists

	1951		1952			1951		1952	
nty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
hoga	2	12.0	8.5	2	Franklin #11	2	19.0	20.7	3
wa	1	4.0	23.0	1	" #12	1	25.0	30.0	1
klin #5	2	13.0	7.0	2	Geauga	3	3.0	4.5	*
' #6	13	21.0	17.0	10	Erie	5	21.4	21.4	*
' #7	10	19.1	14.9	8	Pickaway & Ross	3	10.0	10.0	*
' #8	2	17.0	19.3	3	Eastern Dist.	11	2.6	3.1	*
' #9	3	14.0	11.7	3	Champaign	5	22.8	11.8	*
' #10	3	26.0	23.3	3					

*Number counts not known, since report of change was merely in percentage.

HOMA

'. Gordon, M. M. Dodson, E. E. Sisney, M. H. Whisenhunt, T. H. Hooper

	1951		1952			1951		1952	
ty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
son			41.2	5					
. & nadian			11.6	3	Pittsburg & Latimer			13.6	3
r			45.0	3					

SYLVANIA

. Richter, A. J. Duvall, G. L. Bowers, H. S. Peters

ty	1950 Avg.	1951 Avg.	1952 Avg.	1952 #Count	County	1950 Avg.	1951 Avg.	1952 Avg.	1952 #Count
	14.0	18.0	14.7	3	Erie	16.0	14.0	8.0	1
caster	23.0	20.0	11.4	7	Luzerene			1.0	3
gheny & tler			7.4	5					

H CAROLINA

. Mitchum, Herman Holbrook, Wm. C. Laymon, Frank Nelson, D. E. Wade, H. M. Steele,
. DeLoach, S. A. Lee, A. I. Barron, Jr.

ty	1951 #Count	1951 Avg.	1952 Avg.	1952 #Count	County	1951 #Count	1951 Avg.	1952 Avg.	1952 #Count
endon	2	53.0	21.3	3	(Not indicated)	2	20.0		
land			7.3	3	" "	2	22.0		
ens	2	34.0	15.7	3	" "	2	29.0		
n	2	29.5	12.3	3	" "	2	49.0		
leston			10.0	3	" "	2	21.0		
ee & ckens			3.8	6	Dorchester			9.3	3
					Charleston			18.3	3
					Richland			52.0	3

H DAKOTA

ng Podoll

ty	1951 #Count	1951 Avg.	1952 Avg.	1952 #Count
le			37.5	2

ESSEE

s W. Hammond & others, Tenn. Game & Fish Commission, C. W. Lupton,
s T. Hammond

ty	1951 #Count	1951 Avg.	1952 Avg.	1952 #Count	County	1951 #Count	1951 Avg.	1952 Avg.	1952 #Count
Rte. #1	3	13.0	12.7	3	Highland R.#1	2	8.3	15.7	3
" #2	3	22.3	10.0	3	" " #2	2	12.0	14.3	3
" #3	2	39.5	28.0	3	E.Tenn.V. #1	2	25.0	28.0	3
" #4	2	15.0			" " #2	2	21.3		
ral sin #1	3	27.8			Appalachian Mountains	1	6.0	7.7	3
#2	3	30.7			Shelby			37.3	3
#3	3	17.3	33.3	3	Davidson & Robertson			13.3	3

XAS

G. Teer, Clyde E. Holt, Jr., W. T. Wright, C. H. Johnson, J. R. Singleton,
A. Walker, A. J. Springs, R. J. Holstein

nty	1951		1952		County	1951		1952	
	#Count	Avg.	Avg.	#Count		#Count	Avg.	Avg.	#Count
lerson			13.0	3	Chambers			19.6	3
gelina			30.3	3	Robertson			42.6	3
sque			22.0	3	Wilson			86.0	3

AH

B. Dahlgren

nty	1951		1952	
	#Count	Avg.	Avg.	#Count
lard			13.0	3

GINIA

H. Shaffer, J. W. Aldrich, G. A. Gehrken, D. F. Shuffler, Ernest R. Atkinson

nty	1951		1952		County	1951		1952	
	#Count	Avg.	Avg.	#Count		#Count	Avg.	Avg.	#Count
pbell			27.2	3	Westmoreland & Richmond			3.7	3
rfax	9	7.7							
thampton			23.7	3	Henrico & Hanover	3	12.7		
emond & sle of Wight			10.7	3					

CONSIN

d Wagner & other biologists, D. R. Thompson, C. Lemke, A. Millard, G. J. Knudson,
Mathison

nty	1951		1952		County	1951		1952	
	#Count	Avg.	Avg.	#Count		#Count	Avg.	Avg.	#Count
e &. olumbia #1	3	31.3	32.3	3	Green #4			36.7	3
					Jackson #5			35.0	2
umbia #2	3	23.7	24.0	1	Dunn #6			51.7	3
a #3	3	23.0	15.5	2	Dunn #7			52.0	3

roduced December 1956

XAS

C. Teer, Clyde E. Holt, Jr., W. T. Wright, C. H. Johnson J. R. Singleton,
A. Walker, A. J. Springs, R. J. Holstein

	1951		1952			1951		1952	
unty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
derson			13.0	3	Chambers			19.6	3
gelina			30.3	3	Robertson			42.6	3
sque			22.0	3	Wilson			86.0	3

AH

B. Dahlgren

	1951		1952	
unty	#Count	Avg.	Avg.	#Count
llard			13.0	3

RGINIA

H. Shaffer, J. W. Aldrich, G. A. Gehrken, D. F. Shuffler, Ernest R. Atkinson

	1951		1952			1951		1952	
unty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
mpbell			27.2	3	Westmoreland & Richmond			3.7	3
irfax	9	7.7							
uthampton			23.7	3	Henrico & Hanover	3	12.7		
semond & Isle of Wight			10.7	3					

SCONSIN

ed Wagner & other biologists, D. R. Thompson, C. Lemke, A. Millard, G. J. Knudson,
Mathison

	1951		1952			1951		1952	
unty	#Count	Avg.	Avg.	#Count	County	#Count	Avg.	Avg.	#Count
ne &. Columbia #1	3	31.3	32.3	3	Green #4			36.7	3
lumbia #2	3	23.7	24.0	1	Jackson #5			35.0	2
wa #3	3	23.0	15.5	2	Dunn #6			51.7	3
					Dunn #7			52.0	3

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U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Peachtree-Seventh Building
Atlanta 5, Georgia

Issue No. 7 June 29, 1953

MOURNING DOVE NEWSLETTER
(Not for Publication)

This issue contains a summary of Mourning Dove populations data for ssistance to the states and the Fish and Wildlife Service in preparing dove unting regulations. It will also be of interest to all persons working on his important migratory game bird, whether in state game departments, nstitutions of learning, or individuals.

The previous issue was number 6, June 30, 1952. Since that date many f the southeastern dove projects have been either terminated or modified, o that information has not been gathered as extensively on populations during he past year as formerly. Consequently the major data available at this time as come from call-road counts taken between mid-May and mid-June in 41 states, andom road counts during April and May in 7 southeastern states, and hunter ag checks in 9 southeastern states during last hunting season.

The following information is not for publication or citation. The onclusions have been placed first for quick reference.

Conclusions

The steady upward climb of dove populations in most of the country ast of the 100" meridian has continued for a third successive year. Call-oad counts during May and June have shown an increase in breeding popula-ion of 15 to 20 percent from last summer. Since the early part of the 1953 esting season has been fairly successful we anticipate an increased dove opulation available for the hunter this fall.

Doves have gradually increased in numbers in eastern United States ince the alarming low in the fall of 1950 which was attributed to richomoniasis. The population was further affected by severe weather onditions in the winter of 1950-51. With good production in 1951 and 952 the birds increased each year but we are not yet certain whether they ave reached the high numbers present in 1948-49.

NOV 1 3 1953

NATURAL
HISTORY SURVEY
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The best information at hand indicates the fall population in 1953 should be somewhat greater than that of 1952. We hope that the many cooperators who have contributed data and assistance will continue to gather important populations information from the major Mourning Dove range. Call-road counts were made in most of the western states this year; these will furnish valuable information for comparisons with similar counts in the same areas next season.

Call-road Count Data

A total of 474 call-road count routes was covered in 41 states and one province by 265 cooperators during May and June of this year. This total greatly exceeds that of 196 routes counted in 1952. Most of the states increased the number of their routes this year by wider participation of state technicians, wardens, individuals, and federal game agents. In addition most of the western states have made counts for future assistance.

The number of calling doves and the number of doves seen was recorded on each route. Table 1 shows the counts made in each state for the past three years, and the analysis of the routes is given below.

Summary of Doves HEARD on Call-Road Counts

A. Routes Censused in 1952 and 1953 - Comparable Data

Comparable data from 135 call count transects in states east of the 100" meridian show an average of 22.1 birds heard per route in 1953, an increase from the average of 19.5 birds per route last year. Unless a 1 in 15 mischance in sampling from the 135 routes both years has occurred the number of calling doves in the eastern United States has increased about 15 percent. This difference is nearly significant at the 90 per cent level.

B. Routes Censused in 1952 and 1953 - All Routes

Results from 383 routes in 1953 and 395 routes in 1952 from states east of the 100" meridian show an average of 21.5 doves heard per route this year as compared to an average of 18.2 last year. This increase of approximately 17 per cent in the number of doves calling on all routes in eastern United States is statistically significant at the 99 per cent level, unless a 100 to 1 mischance in sampling has occurred a real increase in the calling population is to be noted for 1953 from these data.

When the 1953 and 1952 data for the states east of the 100" meridian are separated into four sections for analysis they show little change. In fact, both the northeastern section and the midwestern section show no significant change. The southeastern section shows an average decrease to 15.2 in 1953 from 18.4 in 1952; a nearly significant decrease at the 95 per cent level. The lower Mississippi section has an average increase to 23.1 doves per route in 1953 from the average of 18.4 in 1952. This is significant at the 99 per cent level. The table on the next page shows the details of the above comparison and analysis.

Statistical Analysis of Doves HEARD on Call-Road Counts

	All Comparable Routes E. of 100" M.		Total of All Counts E. of 100" Meridian		Sections of Area East of 100" Meridian							
					N. E.		S. E.		Lower Miss.		Midwest	
	52	53	52	53	52	53	52	53	52	53	52	53
Avg. doves per rte.	19.5	22.1	18.15	21.5	9.8	9.7	18.4	15.2	18.4	23.1	20.8	20.7
Std. deviation	13.25	15.95	11.9	16.6	6.4	10.0	11.4	12.0	10.7	13.4	12.9	16.1
Std. error	1.11	1.36	.597	.849	.86	1.7	1.00	1.25	.938	1.39	1.18	1.87
No. of routes	135	135	395	383	43	36	90	92	100	92	89	73

Summary of Doves SEEN on Call-Road Counts

A. Routes Censused in 1952 and 1953 - Comparable Data

Comparable data from 108 call-road count transects in states east of the 100" meridian give an average of 22.8 doves seen in 1953, an insignificant decrease from the average of 23.2 seen on the same routes in 1952. While these averages seem to denote little change in the birds observed, the variability of these data was high and the 15 per cent increase shown in the numbers of birds heard on these same routes is well within the statistical sampling error inherent in the road count data.

B. Routes Censused in 1952 and 1953 - All Routes

Results from 383 call-road count transects in 1953 and 373 in 1952 in states east of the 100" meridian give an average of 20.2 doves seen in 1953, an increase from the average of 16.7 birds seen last year. Thus a comparison of all doves observed on 1952 and 1953 call-road count routes indicates an increase of about 20 per cent, unless a 100 to 1 mischance in sampling has occurred, east of the 100" meridian. The difference in the two years is statistically significant at the 99 per cent level. The table on the next page gives the details of the above comparison and analysis.

Statistical Analysis of Doves SEEN on Call-Road Counts

	Comparable Routes E. of 100" M.		Total of All Counts E. of 100" M.	
	52	53	52	53
verage seen er route	23.2	22.8	16.7	20.2
tandard deviation	24.45	22.05	15.65	21.2
tandard error	2.35	2.12	.81	1.08
umber of routes	108	108	373	383

Hunter Bag Checks

Doves in hunters bags have been checked by wardens and technicians in he ten southeastern states during the past four hunting seasons as part of he Cooperative Mourning Dove Study. Table 2 gives the results of this examination and shows the percent of juveniles in the bags and the kill per gun hour. he number of juveniles gives indication of nesting success and production for he year, while the kill per hour gives indication of the population available o the hunter. The kill per gun hour shows an increase in 6 states and a decrease n two states over the previous season.

Many technicians and wardens have collected a wing from each dove examined o provide important information on percent of juveniles and relative age of uveniles in hunters bags. The southeastern states have included such information n their quarterly and annual P-R reports. In addition, the federal game agents ave sent in a large number of wings from last season's kill, from which the ollowing table has been compiled. This gives the per cent of juveniles and ompares very favorably with that in Table 2.

Analysis of Wings Collected from Doves in Hunters Bags
By Game Management Agents During 1952-53 Season

tate	Dates Collected	Number Wings		Percent of Juveniles
		Adults	Juveniles	
labama	Oct. 12-31 Dec. 27-Jan.3	21 21	23 12	52.2 36.3
lorida	Oct. 2-18	60	132	68.7
eorgia	Sept. 15-25	33	163	83.2
entucky	Sept. 1-8	58	394	87.2
uisiana	Sept. 13	1	24	96.0
ississippi	Oct. 15-29	57	73	56.2
orth Carolina	Sept. 16 - Oct. 14	100	165	62.3
outh Carolina	Sept. 15-27	105	307	74.5
ennessee	Sept. 15-29	317	998	75.9

Table I
Number of Call Count Routes for 1951, 1952, and 1953

tate	1951	1952	1953	State	1951	1952	1953
labama	10	8	9	Nevada			12
rizona			9	New Jersey		3	6
rkansas	4	2	6	New Mexico			4
alifornia			18	New York	4	4	10
onnecticut			1	North Carolina	6	7	18
elaware		1	2	North Dakota	1	2	7
lorida	10	9	25	Ohio	16	16	15
eorgia	10	21	17	Oklahoma		5	4
daho		4	16	Oregon			7
llinois	1	2	29	Pennsylvania	3	5	15
ndiana	1	4	7	Saskatchewan			7
owa		3	11	South Carolina	8	9	17
ansas		7	20	South Dakota		5	2
entucky	11	7	17	Tennessee		11	25
ouisiana	13	7	19	Texas	12	7	10
aryland	3	3	5	Virginia	2	5	11
assachusetts			1	Washington			12
ichigan	1	6	15	West Virginia			3
innesota		4	13	Wisconsin	3	7	4
ississippi	8	9	17				
issouri	5	8	16				
ontana		1	3				
ebraska	1	4	9	TOTAL	133	196	474

TABLE 2 BAG CHECK SUMMARY 1949-52 HUNTING SEASONS

STATE	PERIOD	Number Doves				Percent Juveniles				Kill Per Gun Hour			
		49-50	50-51	51-52	52-53	49-50	50-51	51-52	52-53	49-50	50-51	51-52	52-53
Ala.	10/17-31 Dec. - Jan.	322	242		970 442	12	18.6		59.8 26.9	1.25	1.4	1.4	2.3 1.2
Ark.	[illegible] 10/15	492	104	103* 186+		65	77	65* 55+			2.2		
Fla.	Oct. 12/17 - 1/15	406 774	418	535	319 378**	72.7 21	89.0	82.7	68 31**	1.0 2.3	1.3 2.6	1.3 1.7	2.2 1.9**
Ga.	Sept. Dec. Jan.	2388 [illegible]	1530	1306 [illegible]	1912 469	62	12	73 7	74 12.6	2.1 1.5	2.2	1.8 1.2	1.9 1.5
Ky.	9/1-30 9/16-10/15	888	1129	443	1154	65.6	65.1	73.6	69.2	1.5* 1.94+	[illegible]	[illegible]	1.9
La.	12/1-30 12/12 - 1/10	424	469	706	922	42.5	35.4	35.4		1.9	1.7	1.1	1.8
Miss.	9/16-30 10/15-29	1996	1044		536	69.2	64.6		54.8		1.8	1.5	1.2
N. C.	9/16-30 10/1-15	706	1943	962	676	73.2	60.3	52.5	48	2.1	1.2	1.0	1.4
S. C.	Sept. 12/27-1/10	108	4	430* 1051#	814 964	69.5		75* 69.3#	77 74		2.1	1.8	
Tenn.	Sept. Oct.	465 302	1542 304	1679 177	1354 460	69.5 75.2	57.3 52.0	73 74	79.7 55.7	.53 .49	1.5 1.1	1.3 1.2	1.9 1.7

* Biologists Check
+ Warden Check
** Fla. Season Dec. 15-29, 1952
# Wings

Random Road Counts

Throughout the course of the southeastern dove study each state has kept records of numbers of doves seen during random or controlled road counts. This information has been very valuable in providing information on production, migration, wintering abundance, and comparative abundance. During the past several years we have learned that random road counts can furnish helpful information on dove populations. Table 3 gives the number of miles of such counts in 7 southeastern states for the months of April and May during the past 5 years. The doves per hundred miles gives a basis for comparison of the populations during the different years. The increase in Alabama, Louisiana and Tennessee supplements the increase in the doves heard on call-road counts from the lower Mississippi valley states, while the decrease in Florida, Kentucky and North Carolina is also related to the results of the call-road counts. Such correlation of the results of two techniques serves to strengthen our understanding of the dove picture.

Results of Christmas Bird Counts

For the past fifty years many bird students have conducted an annual count of birds during Christmas week. Great emphasis is given to the finding of as many species as possible in each area, with second emphasis on the numbers of individuals found of each species. Consequently many helpful data may be secured by analyzing these Christmas bird counts, sponsored by the National Audubon ociety, and published in "Audubon Field Notes". Dr. John W. Aldrich, Fish and Vildlife Service, has analyzed these counts to abstract information on the ourning Dove, and reports there was an overall indicated increase of 56 per ent in December 1952 counts from the counts of the previous year in the eastern tates and Texas. The greatest increases were in southern Florida and southern exas and some of the northern midwestern areas. There was a belt of decrease unning across the northern part of the southern states. While this study gives nly an indication of trends and is known to be biased since the greatest effort f the counters is to record as many species as possible, it is interesting to ompare this analysis with results of the other techniques treated in this ewsletter.

Disease

Since the severe outbreak of trichomoniasis in 1950 there seems to ave been an annual gradual decrease in the incidence of this dove disease. nly a few scattered reports of its prevalance have been received for 1953.

Explanation of State Tables

The following pages contain tables showing the results of Mourning Dove all-road counts which have been analyzed in this Newsletter. Only those received a Atlanta by June 25 could be included. The counts are listed by states and ounties; the left side of each table gives a comparison of counts of the same utes for 1952 and 1953 while the right side of the tables give results of new outes in 1953. Unless the cooperators clearly indicated comparable routes the ompilers were unable to correlate 1952 and 1953 routes for counties as indicated. n 1952 each route was covered three times so the figure given represents the verage number of doves heard and seen for each route. Only one count of each oute was made in 1953. All of the counts were taken according to a standardized rocedure prepared on the basis of field research over the past three years. Any arked variation from the instructions rendered the information unuseable and a ew counts were necessarily discarded. Each count began one-half hour before ocal official sunrise and required two hours. It consisted of 20 three-minute stening stations at one mile intervals. The number of doves heard calling ooing) was recorded for each station while the number of doves seen at stations d while driving between stations was listed.

TABLE [illegible]

Random Road Counts for 7 [illegible]ern States for April and May

	1949		1950		1951		1952		1953	
	Miles	D/ 100 Mi.	Miles	D/ 100 Mi.	Miles	D/ 100 Mi.	Miles	D/ 100 Mi.	Miles	D/ 100 Mi.
Apr.	1563	7.8	[illegible]	[illegible]	[illegible]	4.7	8212	3.5	6119	6.7
May	2685	10.1	[illegible]	[illegible]	[illegible]	6.5	11021	5.8	8223	9.6
Apr.	--	--	2276	[illegible]	S. 7474	26.7	3671	34.9	5897	22.4
					N. 5146	21.1	2954	25.6	3430	12.8
May	--		--	--	S. 7760	13.8	5008	30.7	5196	13.9
					N. 5466	11.4	3241	18.6	2445	11.8
Apr.	--	--	--	--	342	4.1	3400	5.0	30765	3.7
May	--	--	--	--	5065	4.8	3300	6.7	26505	5.1
Apr.	--	--	1647	9	7239	2.8	10978	1.9	15007	4.9
May	--	--	1279	14	9348	7.9	8267	5.4	12292	6.5
Apr.	--	--	1584	2.1	12838	4.5	11689	3.6	7324	3.4
May	--	--	1504	4.1	12977	8.0	11932	4.2	4462	3.1
Apr.	--	--	--	--	1455	5.0	6447	3.7	11131	7.1
May	--	--	--	--	2036	6.5	4143	13.5	8030	15.8
Apr.	20586	14.3	1383	14.5	7036	5.2	602	9.5	--	--
May	26336	19.5	1340	21.9	6984	8.4	1243	12.9	38128	14.6

The persons conducting counts are listed alphabetically under each state. We gratefully acknowledge their cooperation and hope they may be able to repeat the 1953 routes next year for future information on fluctuations in the dove breeding population.

This issue of the Mourning Dove Newsletter was compiled by Harold S. Peters, Branch of Wildlife Research, Fish and Wildlife Service, Atlanta, Georgia. All of the statistical analysis was made by Leonard E. Foote, Southeastern Representative of the Wildlife Management Institute.

ALABAMA

P. W. Close, J. K Lightsey, L. M. Martin, C. H. Richardson Jr., W. Rosene Jr.

	Heard		Seen	
County	1952	1953	1952	1953
Montgomery	44.7	31	23	29

	Heard	Seen
County	1953	1953
Montgomery	26	6
Montgomery	40	9
Morgan	44	25
Limestone	38	20
Baldwin	20	9
Etowah	29	8
Mobile	16	7
Mobile	9	10

ARIZONA

T. O. Barnes, Bruse, Fleming, S. Gallizioli , T. Knipe, Charles Murray, G. W. Peterson, W. Swank, N. C. Williams

	Heard	Seen
County	1953	1953
Graham	41.6	218
Santa Cruz	53.6	74.3
Pima	30.3	41.6
Graham	58.6	38.3
Maricopa	65.6	362
Maricopa	66.6	307.6
Maricopa	35.6	398.3
Maricopa	20.6	11.3
Maricopa	27.3	232

ARKANSAS

J. W. Perkins, M. J. Turner, White River Refuge

	Heard		Seen	
County	1952	1953	1952	1953
Arkansas	19	40	61	45
Craghead	14.7	36	54	90

	Heard	Seen
County	1953	1953
Arkansas	55	33
Craghead	47	59
Ouachita	14	27
Ouachita	13	32

CALIFORNIA

William Anderson, W. D. Bailey, W. A. Brann, J. B. Cowan, W. W. Elders, C. G. Fairchild, Thomas Garrett, E. H. Koobs, F. E. Kreller, Wallace Macgregor, Erwin Single, . R. Switzer, W. A. Wooten

CALIFORNIA (Continued)

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Los Angeles	18.8	36	29.8	39

County	Heard 1953	Seen 1953
Sutter	15	27
Butte	32	36
Humboldt	11	69
Modoc	19	15
Tehama-Shasta	76	37
Los Angeles	23	42
Imperial	50	372
Imperial	33	484
Riverside	29	133
Ventura	127	48
Los Angeles	44	107
Colusa	14	74
San Joaquin	0	138
Sacramento	8	0
Modoc	22	7
Imperial	21	622
Merced	8	23

CONNECTICUT

R. S. Billard

County	Heard 1953	Seen 1953
Hartford	5.5	1

DELAWARE

H. P. Cofer, N. G. Wilder

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Kent	20.6	28	3.6	12

County	Heard 1953	Seen 1953
New Castle	6	4

FLORIDA

S. L. Beckwith, R. P. Esser, M. F. Hudson, N. H. Long, F. T. Phillips, T. W. Sistrunk, Frank Winston, J. W. Wolfley

FLORIDA (Continued)

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Franklin	21	23	28	14
Polk	10	32	41	14
Dade	21.5	29.5	2.7	10.5
Charlotte	20.2	29.5	3.3	2.5
Leon	19.3	21		17
Polk	17	25		3
Washington	3	9		0

County	Heard 1953	Seen 1953
Alachua	0	14
Alachua	7	1
Alachua	0	10
Alachua	4	3
Marion	7	0
Levy	11	6
Gadsden-Leon	13	7
Levy-Marion	27	40
Levy-Alachua	29	43
Orange	26	12
Lee	0	0
Highlands	18	12
Lafayette	28	9
Volusia	14	0
Columbia	3	0
Bay	0	0
Walton	5	6
Santa Rosa	18	9

EORGIA

obert Cannon, Jack Connell, Jack Crockford, W. T. Harrod, James Jenkins, Marvin ohnson, Dan Nelson, E. P. Odum

ounty	Heard 1952	Heard 1953	Seen 1952	Seen 1953
ibb & Monroe	12	9	9	5
odge & Pulaski	10	8	5	7
alker	23	21		7
nion	5.5	12		5
artow	27.5	32		11
ranklin	38.5	38		32
palding	18	21		4
incoln	15.3	17		0
aylor	7	23		20
ashington	25	21		0
aurens	21.3	17		2
ulloch	21	7		3
andolph	20	31		3
ecatur	16.3	15		5
amden	1	0		0
owndes	5.7	11		4
conee	7.5	17.6		21.2

IDAHO

Elwood Bizeau, Charles Blake, E. T. Carter, J. S. Cromwell, Edson Fichter, Mr. and Mrs. Hugh A. Harper, Milt Reeves, R. L. Se[illegible]er

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Bingham	6.8	6	18	18.5
Power	17	27	31.5	21
Bannock	11	7	12	10
Caribou	7	12	25	17

County	Heard 1953	Seen 1953
Nez Perce	38	32
Nez Perce	8	7
Ada-Canyon	46	191
Nez Perce	28	42
Nez Perce	57	55
Jerome	29	23
Twin Falls	25	121
Power	1	49
Jefferson	6	44
Bonneville	10	51
Ada-Canyon	16	16
Bear Lake	23	5

ILLINOIS

eorge Arthur, H. A. Ball, Lee Bush, John Calhoun, W. H. Casey, P. Dickinson, . W. Gulbreath, B. N. Haddick, R. R. Harmon Sr., L. H. Harms, Mrs. B. M. Hicks, . R. Hoffman, C. K. Hutchinson, H. J. Kampmann, A. L. Keck, C. W. Kossack, . Kringer, J. Lockart, Brittan Masters, O. W. Mechfessel, J. H. Moak, L. R. ietch, C. F. Sherrer and son, J. Slachter, G. L. Terwilliger, Mr. and Mrs. ucas Wrischnik

ounty	Heard 1952	Heard 1953	Seen 1952	Seen 1953
ook & Lake	8	24	13	6
ee	2.3	4	3.6	6

County	Heard 1953	Seen 1953
Union	23	8
St. Clair	12	23
Madison	6	14
Madison & Jersey	4	21
DeKalb	0	3
Macon	0	8
Macon	0	9
Mason	75	120
Mason	64	122
Ogle	27	5
Ogle	20	7
Macon	3	21
Williamson	26.5	20.5
St. Clair	39	26

(Continued next page)

ILLINOIS (Continued)

County	Heard 1953	Seen 1953
St. Clair	1	7
St. Clair & Monroe	24	14
Hancock	37	43
Marshall & Pittman	8	5
Ogle	5.7	8
Fulton	60.7	55
Washington	33.3	27
Whiteside	4	5
Lawrence	34.7	52
Champaign	2	10
Williamson & Jackson	22	24
Williamson & Jackson	57	34
Lee	16	13

INDIANA

J. M. Allen, D. M. Brooks, W. E. Ginn, M. C. Reeves

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Whitley	20	39	9.3	11
Daviess	28.3	29	52.6	43
Hendricks	15.3	11	11.3	21
Jasper & Pulaski	16	40	21.2	27

County	Heard 1953	Seen 1953
Whitley	29	6
Daviess	38	75
Hendricks	17	33

IOWA

W. C. Brabham, L. C. Fleming, E. L. Kozicky, H. T. Maltby, R. J. Meyerding, G. Soselyn, H. T. Walsh

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Winnebago	29	34	26	18
Clay	49.7	11	46	11

County	Heard 1953	Seen 1953
Story	17	41
Boone	41	20
Emmet	22	43
Polk & Dallas	19	45
Mills & Fremont	46	40
Worth	23	30
Lee	50	69
Clay	28	76
Emmet	30	60

KANSAS

Coats, Dave Coleman, T. C. Gatie, Leo Klameth, M. E. Ramsey, T. S. Robinson, D. Schwilling

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
arber	5.3	12	41	[illegible]
eno	25.7	48	111	53
edgwick	36	29	116	81
arton	24.3	19	84	62
ontgomery	13.3	5	40	27
aline	51	81	112	63
hawnee	22.7	20	38	19

County	Heard 1953	Seen 1953
[illegible]	27	41
Franklin	27	39
Russell	61	65
Barton	64	87
Rush	8	35
Finney	9	2
Finney	36	42
Pratt	17	54
Cloud	92	52
Marshall	65	43
Lyons	15	41
Crawford	18	25
Ness	22	31

ENTUCKY

arold Barber, Bruna, A. R. Bumsted, F. W. Collins, W. L. Gault, T. A. McGowan, A. Grizzell, Jr., F. C. Hardy, W. B. Lee, Arnold Mitchell, A. E. Smalley, M. Smith, R. C. Soaper, Chester Stephens

ounty	Heard 1952	Heard 1953	Seen 1952	Seen 1953
enderson	10	16	32.3	27
enderson	19	23		10
ackson	4.7	3		0
hristian	17	15		6
arue	15	26		24

County	Heard 1953	Seen 1953
Bourbon	10	3
Calloway	24	22
Trigg & Lyon	20	5
Trigg & Lyon	3	13
Henderson	25	45
Shelby & Spencer	31	38
Knox	12	7
Carroll, Henry & Trimble	27	4
Morgan	21	2
Lawrence	2	0
Adair	14	7
Calloway	33	35

LOUISIANA

R. T. Barnes, Paul Cole, J. B. Kidd, R. E. Murry, J. D. Newson, V. H. Reid, J. D. Withers

County	Heard 1953	Seen 1953
Morehouse Parish	15	4
Acadia	5	3
Sabine & Vernon	22	9
East Baton Rouge & Iberville	6	4
E. Feliciana	11	5
Concordia	21	38
Lafayette	10	26
Lafayette	20	30
Baton Rouge	13	22
Terrebone	12	18
Rapides	18	2
Rapides	19	12
Vernon & Natchitoches	35	13
Natchitoches	39	9
Webster & Claiborne	28	23
Acadia	3	6
West Baton Rouge & Iberville	14	3
Fangipahoo	18	5
Caldwell & Ouachita	36	11

MARYLAND

D. H. Arner, H. M. Balderson, A. J. Duvall, S. M. Keefer, P. D. Lines, C. S. Robbins, Milton, Siegert

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Howard	13	8	5.6	4
Prince George	13.7	16	5.7	4

County	Heard 1953	Seen 1953
Washington	1	6
Howard	6	30
Prince George	37	54

MASSACHUSETTS

Bertram Leaheater

County	Heard 1953	Seen 1953
Essex	11	15

MICHIGAN

P. Baumgras, L. Buchholder, G. Carter, S. Creech, O. DeWaard, H. Dykema, A. G. Gazlay, V. Janson, J. E. Null, Petoskey

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Washtenaw	18	24	8.3	14
Kent	23.5	30	4.7	12

County	Heard 1953	Seen 1953
Monroe	13	16
Tuscola	0	2
Tuscola	5	3
Washtenaw	16	10
Ingham	13	2
Monroe	33	5
Bay	21	5
Luce	0	0
Luce	0	0
Newaygo	25	3
Newaygo	16	3
Ingham	27	8
Ingham	19	6

MINNESOTA

L. J. Bonde, F. H. Davis, W. J. Ellerbrock, Jr., W. H. Longley, L. L. Pike, N. J. Ordal

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Jackson	57	38	32.5	16
Olmsted	35.5	12	54.5	13
Scott	7.3	22	20.3	15
Olmsted	38.5	12	46.5	11
Polk & Red Lake	13.5	22	10.5	14

County	Heard 1953	Seen 1953
Dakota	37	25
Jackson	45	29
Nobles	33	22
Nobles	28	16
Beltrami	17	9
Ottertail	35	37
Dodge	23	9
Olmsted	11	11

ISSISSIPPI

. Bobbs, Jr., N. C. Hutcheson, [illegible], [illegible], J. H. Phares, H. R. Redmond,
. Starkey

	Heard		[illegible]	
ounty	1952	1953	[illegible]	[illegible]
ssoquena	14.6	24	[illegible]	[illegible]
arren & Yozee	16.4	18	[illegible]	[illegible]
ankin	31.2	41	[illegible]	[illegible]
afayette	2.7	4	[illegible]	[illegible]
tone	20	26	[illegible]	[illegible]
ashington	9.3	32	[illegible]	[illegible]
inds & Madison	5.7	14	[illegible]	[illegible]

County	Heard 1953	Seen 1953
[illegible]	50	74
Rankin	22	22
Washington	21	16
[illegible] & Warren	9	16
Washington & Issaquena	11	31
Warren & Claiborne	12	18
[illegible]	44	25
[illegible]	40	9
Lafayette	2	9
[illegible]	16	5

ISSOURI

. R. Alexander, P. B. Dowling, [illegible], [illegible] Lewis, G. J. Maschmann,
. P. McCormack, Kenneth Sadler, [illegible]

	Heard		[illegible]	
unty	1952	1953	[illegible]	[illegible]
pe Girardeau	33.3	43	[illegible]	[illegible]
well - Douglas	10.6	13	[illegible]	[illegible]
een	22	16	[illegible]	[illegible]
one	37.6	51	[illegible]	[illegible]
. Charles	18.3	26	[illegible]	[illegible]

County	Heard 1953	Seen 1953
Callaway	35	46
Cole	41	15
Cape Girardeau	14	12
[illegible] Daviess	42	22
[illegible]	30	65
Texas	9	10
Green	16	30
St. Charles	25	22
[illegible]	34	77
Lawrence	11	29
[illegible]	50	78

NTANA

D. Birch, L. A. Peterson, George [illegible]

	Heard		[illegible]	
unty	1952	1953	[illegible]	[illegible]
llowstone	33	24	[illegible]	[illegible]

County	Heard 1953	Seen 1953
Lewis & Clark	1	4
Yellowstone	54	2

EBRASKA

ave Eigsti, W. E. Eigsti, E. W. Glandon, W. B. McClure, L. M. Moos, H. M. Morgan, urton Nelson

ounty	Heard 1952	Heard 1953	Seen 1952	Seen 1953
ancaster	47.6	31	93.6	83
dams	17	21	81.5	42

County	Heard 1953	Seen 1953
Lancaster	31	36
Lancaster	5	37
Hamilton	82	89
Adams	76	69
Lincoln	9	12
Logan	22	3
Logan	53	18

EVADA

. L. Cantrell, B. H. Cater, Billy Clark, O. V. Deming, Earl Dudley, J. C. Greenley, . W. Gullion, B. M. Hazeltine, B. B. McKaig, Ed Siri, Fred Wright

County	Heard 1953	Seen 1953
Churchill	14	66
Clark	32	38
Clark	40	28
Clark	11	10
Clark	0	0
Elko	0	26
Elko	3	20
Lyon	17	17
Lincoln	6	683
Nye	98	337
Pershing	20	83
Washoe	0	0

W JERSEY

G. Bevan, R. A. Spinks, R. D. Spinks

unty	Heard 1952	Heard 1953	Seen 1952	Seen 1953
ssex	5.6	4	1	1
nterdon	6.0	7	1.6	12
mberland	4.3	3	1	12

County	Heard 1953	Seen 1953
Cumberland	4	10
Sussex	3	1
Hunterdon	10	18

NEW MEXICO

H. Campbell, L. S. Gordon

County	Heard 1953	Seen 1953
Bernalilla & Valencia	27	51
Bernalilla, Santa Fe & Sanderal	9	7
Grant	93	131
Grant	81	52

NEW YORK

C. P. Brown, Charles Mason, H. S. Peters, Dennis Tascar, E. E. Wagner, J. A. Walker

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Niagara	20	34	21	20
Niagara	17	34	17	15
Orleans & Genessee	17	34	7	8
Wayne	18	42	14	33

County	Heard 1953	Seen 1953
Seneca	6	6
Seneca	14	5
Suffolk	49	15
Jefferson	23	0
Herkimer	8	0
Albany	4	1

NORTH CAROLINA

R. L. Bird, Robert Halstead, R. B. Hazel, H. V. Hines, B. H. James, R. E. Milstead, T. R. Mitchell, S. F. Poole, G. J. Ross, C. B. Woodhouse

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Cabarrus	43.3	40	39.3	15
Johnston	23	29	24.7	35
Davidson	21.3	25	14	30
Macon	9.3	8	1	2
Wake	17.7	12	22	21
Robeson	31.3	21	23.3	5
Pitt & Martin	29.7	16	2.3	1.5

County	Heard 1953	Seen 1953
Carrituck	11	11
Martin	29	14
Johnston	15	18
Iredell	36	26
Macon	2	0
Wake	18	30
Robeson	22	2
Beaufort	5	41
Martin & Beaufort	1	22
Dare	2	4
Rowan	33	70

NORTH DAKOTA

D. V. Gray, Harry Jensen, R. N. Randall

	Heard		Seen	
County	1952	1953	1952	1953
Burleigh	42	33	20.3	26

	Heard	Seen
County	1953	1953
McHenry & Bottineau	47	18
Burleigh	60	15
Sheridan	10	11
Startsman	11	33
McHenry	6	11
Startsman	4	6

OHIO

H. S. Peters, Jere Preston, W. B. Price, H. Wheeler

	Heard		Seen	
County	1952	1953	1952	1953
Ottawa	23	12	2	13
Franklin	7	18	7.5	10
Franklin	17	22	12.5	20
Franklin	15	31	10.3	17
Franklin	19	12	15.3	9
Franklin	12	12	13.3	15
Franklin	23	30	15	24
Franklin	21	24	12.0	6
Franklin	30	13	11	14

	Heard	Seen
County	1953	1953
Pickaway & Ross	7	36
Athens	25	2
Wood	4	19
Wood	3	18
Wood	1	21
Wood	0	23

OKLAHOMA

M. M. Dodson, T. H. Hooper

	Heard		Seen	
County	1952	1953	1952	1953
Oklahoma & Canadian	11.6	5	12.6	6
Pittsburg & Latimer	13.6	9	13	17

	Heard	Seen
County	1953	1953
Wagoner	5	16
Tulsa & Rogers	7	11

OREGON

Paul Bonn, M. S. Cummings, T. R. Lawhorn, I. D. Luman, J. C. Savage, C. R. Shepard, C. N. Underwood

County	Heard 1953	Seen 1953
Umatilla	10	30
Jackson	8	1
Umatilla	52	32
Yamhill	7	30
Klamath	87	11
Deschutes	22	1
Umatilla	46	26

PENNSYLVANIA

G. L. Bowers, J. P. Eicholtz, S. E. Forbes, J. M. Haverstick, Robert Howarth, S. C. Mace, H. S. Peters, W. C. Richter, R. L. Snyder, C. R. Studholme

County	Heard		Seen	
	1952	1953	1952	1953
Erie	8	10	2	5
Elk	2.5	1	.5	0
Luzerne	1	0	10.6	5
Allegheny & Butler	7.4	6	1.2	4
Lancaster	9.3	15	2.3	7
Lancaster	17.3	13	9.3	3
York	14.7	7	10	9

County	Heard 1953	Seen 1953
Elk & Jefferson	0	2
Centre	1	0
Centre	1	2
Lycoming & Clinton	4	3
Franklin	6	4
Center	18.1	1
Perry	1	0
Perry	4	1

SASKATCHEWAN

T. A. Harper, R. A. Ruttan

Location	Heard 1953	Seen 1953
Lat. 50° 45', Long. 104° 55'	30	4
Lat. 50° 44', Long. 105° 3'	4	1
Lat. 53° 12', Long. 105° 56'	19	5
Lat. 50° 36', Long. 104° 53'	20	11
Lat. 50° 48', Long. 104° 55'	14	2
Lat. 52° 43', Long. 108° 12'	0	0
Lat. 52° 4', Long. 107° 59'	0	0

SOUTH CAROLINA

A. I. Barron, Jr., G. H. Brown, H. L. Holbrook, W. C. Lehmann, L. H. Myers, H. M. Steele, D. E. Wade

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Dorchester	9.3	10	0.3	1
Charleston	11.3	21	11	3
Richland	52	17	9	12
Anderson	4	3	51	77
Oconee & Pickens	3.8	6	12.3	40
Richland	7.3	8	16	12
Clarendon	21.3	22	3.7	1
Laurens	15.7	34	27.7	14
Aiken	12.3	12	6	9
Charleston	10	13	1	4

County	Heard 1953	Seen 1953
Lexington	63	40
Anderson	7	84
Oconee	4	46
Richland	15	2
Charleston	4	0
Edgefield	19	10
Edgefield	18	6

SOUTH DAKOTA

L. Sutton

County	Heard 1953	Seen 1953
Brown	20	73
Brown	16	49

ENNESSEE

D. Eadie, J. T. Hammond, C. R. Hayes, J. C. Howell

ounty	Heard 1952	Heard 1953	Seen 1952	Seen 1953
helby	27	36	29	13
est #1	12.7	17		26
est #2	10	16		10
est #3	28	49		22
ighland Rim #1	15.7	12		
ighland Rim #2	14.3	15		
entral Basin	33.3	38	22	66
ast Tenn. #1	28	39	8.7	21

County	Heard 1953	Seen 1953
Shelby-Tipton	44	29
Davidson & Cheatham	22	20
Blount	11	30
Knox	14	3
Knox	10	5
West #1A	16	31
West #2A	20	13
West #3A	72	23
Highland Rim #1A	17	17
Highland Rim #2A	10	13
Central Basin #3A	32	14
Central Basin #4A	18	9
Central Basin #5A	30	20
Central Basin #5B	35	33
East Tenn. #1A	34	15
East Tenn. #3A	9	7
East Tenn. #3B	12	7

TEXAS

R. J. Holstein, C. E. Holt, Jr., C. H. Johnson, Jr., J. R. Singleton, A. J. Springs

	Heard		Seen	
County	1952	1953	1952	1952
Wise	5.3	23	40	28
Robertson	42.6	24	32	15
Chambers	19.6	26	42	59
Bosque	22	44	57.3	33
Wilson	86	127	132	90

	Heard	Seen
County	1953	1953
Wise	10	9
Robertson	42	49
Chambers	25	14
Wilson	128	75
Bosque	57	28

VIRGINIA

J. W. Aldrich, E. R. Atkinson, G. A. Gehrken, J. C. Harvey, Jr., H. S. Mosby, C. H. Shaffer, D. F. Shuffler

	Heard		Seen	
County	1952	1953	1952	1953
Westmoreland & Richmond	4.6	23	14.3	43
Alexandria & Fairfax	5.3	11	2.6	15
Campbell	27.2	27	8	11
Southampton	23.7	24	12	38
Nansemond & Isle of Wight	14	18	33.3	29

	Heard	Seen
County	1953	1953
Fairfax	14	9
Essex	25	37
Bedford	15	22
Nansemond & Isle of Wight	15	17
Southampton	22	6
Montgomery	3	3

WASHINGTON

. T. Carter, L. R. Childers, M. C. Dillon, H. A. Hansen, M. H. Lundy, . H. Oliver, L. Seabury

	Heard	Seen
County	1953	1953
Spokane	16	14
Douglas	30	19
Spokane	0	1
King	2	0
Skagit	0	0
Yakima	39	100
Yakima	91	171
Okanogan	39	70
Yakima	52	137
Yakima	77	184
Yakima	68	144
Whitman	42	47

WEST VIRGINIA

H. . Dahl, David [illegible]

County	Heard 1952	Heard 1953	Seen 1952	Seen 1953
Hampshire	5.3	6	1.6	8
Mason	10	11	2	[illegible]

County	Heard 1953	Seen 1953
Mason	7	6

WISCONSIN

J. Hamerstrom, C. L. Herner

County	Heard 1953	Seen 1953
Winnebago	7	1
Winnebago	17	3
Portage	25	7
Adams	20	16

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U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Peachtree-Seventh Building
Atlanta 5, Georgia

ISSUE NO. 8 April 1954

MOURNING DOVE NEWSLETTER
(Not for Publication)

During the 1953-54 hunting season dove hunter bag checks were made in every state where Mourning Doves were hunted. For the first time some information is available on the hunter success from all 28 dove hunting states. Over 13,000 hunters were contacted in the field to secure information on the hours hunted and number of doves bagged. About one-third of the hunters had completed their day's hunt at the time of contact, and 31 per cent of these had secured their bag limit. The average kill per hunter was 5.2 doves for the completed hunt.

The wardens and biologists making the bag checks secured a wing from approximately half of the doves examined. Over 28,000 wings were carefully analyzed to provide information on the juvenile-adult ratio and the approximate hatching dates of the juveniles.

The results of bag checks and wing analyses are given in eight tables with enough explanation to provide a picture of the 1953-54 Mourning Dove season. This is presented for use of administrators and biologists in following the Mourning Dove population in connection with formulation of future dove regulations.

Another Newsletter (No. 9) will be issued about the end of June to summarize results of Mourning Dove call counts which are to be made in all states between May 20 and June 10. Consequently, Dove Newsletters 8 and 9 will be useful to the states and this Service in understanding the Mourning Dove situation. This issue has been compiled by Harold S. Peters and Mrs. Joan H. Wolfe, Branch of Wildlife Research.

Bag Checks

Table 1 gives the results of bag checks in 28 states and shows the kill per gun hour in each state, as well as for each of the split seasons in six states. The dates of the open season are given in all instances. Table 2 presents information from those hunts which were complete at the time of contact in 25 states. Consequently, it is composed of extracts from Table 1. There is little difference in the kill per gun hour between the incompleted and completed hunts; however, additional information can be secured from the completed hunts such as number of hunters killing their limit and the kill per hunt.

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Table 3 gives comparative information on the past five dove hunting seasons in the ten Southeastern states which participated in the Cooperative Mourning Dove Study under the Federal Aid to Wildlife Program. Due to intensive efforts of Game Management Agents and state personnel, nearly three times as many doves were examined in these ten states during the past season than in any previous hunting period.

Since Tables 1 and 2 indicated a higher kill per gun hour in western states, information from the states was separated into the four major flyways presently used in waterfowl management and shown in Table 7. Only those states in which 100 or more hunters were contacted are included. While we do not advocate Mourning Dove management by flyways, it is interesting to note that the kill per gun hour was highest in the Pacific flyway and progressively less in the other flyways eastward, with the Atlantic being lowest. These differences may reflect variations in density of dove populations, which may be shown in call counts during the next year or two. Recoveries of banded doves do not indicate sufficient basis for flyway management, but this table does provide food for thought.

Wing Analysis

The right wing from 28,000 doves was collected from hunters' bags in 24 states during the 1953-54 season. About two-thirds of these were analyzed by state technicians while the remainder were studied in this office. The information secured from recording the molt of primaries in these wings is considered of sufficient importance to warrant the small amount of trouble necessary to collect them and send them to a central point for analysis. The juvenile-adult ratio of doves killed by hunters can not be secured in any other manner. Wings were classed as juveniles only when one or more primary coverts were white-tipped. This procedure was adopted by the Southeastern dove workers, and hence the results from the past season's analysis will compare with those of the previous four hunting periods. We readily admit that this procedure is not entirely satisfactory since doves from the early part of the nesting season have attained adult plumage before the hunting season, and consequently will be classified as adults. Therefore, the percentage of adults as shown in Tables 4, 5, and 6 will be higher than actually occurs; but, until some field technique has been developed to enable separation of these adult-plumaged juveniles, we believe it is desirable to continue this procedure.

Table 4 gives the percentage of juveniles in the September bags for 20 states. This averages 67 per cent of 20,282 doves. Following the investigations of molting doves conducted by Jenkins in Georgia and Swank in Texas, explained in Mourning Dove Newsletter Number 3 (January 1951) and our leaflet "Suggestions for Aging Juvenile Mourning Doves from Molting Primaries"(April 1951), it is possible to ascertain the approximate hatching dates of the juveniles in Table 4. These were hatched from late April through August with the majority being produced during the months of June and July. When doves from several broods are harvested by hunters and the juvenile-adult ratio is

not less than 2:1, it appears that the population is not being selectively harvested, and that successful production of young occurred during the summer. Consequently this juvenile-adult ratio is of importance to both administrators and biologists.

Wings collected from September hunting provide many worthwhile data whereas wings collected from later hunting usually indicate an increasingly higher percentage of adults and are less reliable in showing the percentage of birds of the year being harvested. Tables 5 and 6 include results of analyses of wings from later hunting.

Kill of Feeding Adults

When examining doves in hunters' bags, most biologists have examined the crops of those birds deemed to be adults. Some adults were found with an enlarged or glandular crop which indicates the production of "dove milk." This glandular crop condition is interpreted to indicate dependent nestlings which may not survive when one of the parents is killed. Since the nesting season extends into the hunting season in many states, it becomes important to know the number of adults killed with dependent nestlings. Table 8 gives this information for four of the Southeastern states as included in their quarterly PR Reports. Since exact definition of the degree of glandular crop condition which indicates dependent nestlings has not been satisfactorily determined, technicians do not agree on the precise definition of this crop condition; consequently, there is some discrepancy between the records of biologists working in different states and even between those working in the same state. As yet we are unable to determine what percentage of adults with dependent nestlings can be harvested safely in early hunting seasons without depleting the over-all dove population.

Acknowledgements

The data included in this Newsletter have been gathered by approximately 300 individuals in 28 states. These have included sportsmen, state biologists, state wardens, Game Management Agents, and other Service personnel. We greatly acknowledge their excellent cooperation and appreciate their contributions which made this summary possible. The excellent spirit of co-operation which has characterized the extensive dove investigation beginning in 1948 is thus continued, and we believe this free exchange of information will be helpful to all concerned. We hope that the same type of information will be gathered from hunters' bags in subsequent dove seasons, and that more checks will be made in order to provide representative information. The data were too few in some states this season.

Copies of this Newsletter are being sent to each person who furnished information used herein.

TABLE 1

MOURNING DOVE BAG CHECKS, 1953-1954

State	Date	Doves Killed	Hours Hunted	No. of Hunters	Kill Per Gun Hour
Alabama	10/17 - 31	4,599	2,985	1,164	1.54
"	12/27 - 1/10	1,956	1,684	627	1.16
Arizona	9/1 - 10/12	3,449	1,045	608	3.30
Arkansas	9/15 - 10/14	1,038	839	247	1.24
California	9/1 - 30	2,763	1,221	396	2.26
Colorado	9/1 - 10/5	134	99	48	1.35
Delaware	10/1 - 30	257	145	57	1.77
Florida	10/1 - 15	4,526	2,403	1,121	1.88
"	12/15 - 29	1,755	852	416	2.06
Georgia	9/15 - 29	804	478	192	1.68
"	12/25 - 1/8	613	310	113	1.98
Idaho	9/1 - 15	59	23	12	2.57
Illinois	9/1 - 30	654	387	144	1.69
Kansas	9/1 - 30	1,172	625	391	1.88
Kentucky	9/1 - 30	4,467	3,233	1,102	1.38
Louisiana	12/12 - 1/10	2,742	1,303	593	2.10
Maryland	9/15 - 29	1,053	907	300	1.16
Mississippi	9/15 - 29	1,481	1,493	347	.99
"	12/27 - 1/10	532	295	91	1.80
Missouri	9/1 - 30	5,026	2,369	1,384	2.12
New Mexico	9/1 - 10/12	661	262	100	2.52
Nevada	9/1 - 30	300	146	74	2.05
North Carolina	9/15 - 29	2,368	1,565	576	1.51
Oklahoma	9/1 - 30	1,779	765	282	2.32
Oregon	9/1 - 15	1,065	511	188	2.08
Pennsylvania	9/15 - 10/14	262	438	149	.60
South Carolina	9/15 - 29	979	542	248	1.81
" "	12/26 - 1/9	144	95	39	1.52
Tennessee	9/1 - 15	6,477	3,150	1,372	2.06
"	10/28 - 30	382	228	97	1.68
Texas	9/1 - 10/10	517	202	83	2.56
Utah	9/1 - 15	812	659	170	1.23
Virginia	9/16 - 10/31	905	657	192	1.38
Washington	9/1 - 15	1,295	600	299	2.16
Total		57,026	32,516	13,222	1.75

TABLE 2

KILL PER COMPLETED HUNT (Extract from Table 1)

State	Date	Doves Killed	Hours Hunted	Kill Per Gun Hour	No. of Hunters	No. of Hunters Killing Limit(8)	% of Hunters Killing Limit	Number of Hunters Exceeding Bag Limit	Kill Per Hunter
Alabama	10/17-31	2,280	1,489	1.53	526	119	22.6	4	4.33
"	12/27-1/10	954	665	1.43	204	55	27.0	-	4.68
Arkansas	9/15 - 10/14	764	622	1.23	166	46	27.7	-	4.60
California	9/1-30	2,416	992	2.44	296	177 *	59.8	12	8.16
Colorado	9/1 - 10/5	89	64	1.39	25	2 *	8.0	-	3.56
Delaware	10/1-30	213	103	2.07	37	17	45.9	-	5.76
Florida	10/1-15	1,616	722	2.24	327	67	20.5	7	4.94
"	12/15-29	1,261	589	2.14	242	62	25.6	18	5.21
Georgia	9/15-29	564	354	1.59	135	27	20.0	2	4.18
"	12/25 - 1/8	481	242	1.99	82	27	32.9	-	5.87
Idaho	9/1-15	54	21	2.57	10	2 *	20.0	-	5.40
Illinois	9/1-30	610	357	1.71	126	38	30.2	-	4.84
Kansas	9/1-30	673	336	2.00	180	12 *	6.7	-	3.74
Kentucky	9/1-30	2,426	1,523	1.59	449	175	39.0	2	5.40
Louisiana	12/12-1/10	2,370	1,448	1.64	415	177	42.7	1	5.71
Maryland	9/15-29	814	568	1.43	189	46	24.3	1	4.31
Mississippi	9/15-29	533	217	2.46	108	57	52.8	-	4.94
"	12/27 - 1/10	65	10	6.50	10	6	60.0	1	6.50
Missouri	9/1-30	715	314	2.28	171	53	31.0	-	4.18
Nevada	9/1-30	176	55	3.20	36	8 *	22.2	-	4.89
New Mexico	9/1 - 10/12	423	169	2.50	53	25 *	47.2	3	7.98
North Carolina	9/15-29	328	218	1.50	58	24	41.4	-	5.66
Oklahoma	9/1-30	218	70	3.11	31	14 *	45.2	-	7.03
Oregon	9/1-15	1,039	465	2.23	161	68 *	42.2	-	6.45
Pennsylvania	9/15 - 10/14	215	280	.77	98	5	5.1	-	2.19
South Carolina	9/15-29	464	243	1.91	82	20	24.4	6	5.66
" "	12/26 - 1/9	99	77	1.29	30	3	10.0	-	3.30
Texas	9/1 - 10/10	456	164	2.78	56	23 *	41.1	5	8.14
Virginia	9/16-30	447	305	1.47	81	26	32.1	1	5.52
"	10/17-31	153	111	1.38	37	6	16.2	-	4.14
Washington	9/1-15	190	68	2.79	32	10 *	31.3	-	5.94
Total		23,106	12,861	1.80	4,453	1,397	31.4	63	5.19

*Bag limit of 10 doves allowed.

TABLE 3

BAG CHECK SUMMARY
1949-1953 HUNTING SEASONS

Ten Southeastern States

State	Period	Number Doves					Per Cent Juveniles					Kill Per Gun Hour				
		49-50	50-51	51-52	52-53	53-54	49-50	50-51	51-52	52-53	53-54#	49-50	50-51	51-52	52-53	53-54
Ala.	Oct.				970	4599				59.8	69.7				2.3	1.54
"	Dec.-Jan.	322	242		442	1956	12	18.6		26.9	13.4	1.25	1.4	1.4	1.2	1.16
Ark.	Sept.-Oct.	492	104	103*		1038	65	77	65*		35.3		2.2			1.24
"				186**					55**							
Fla.	Oct.	406	418	535	319	4526	72.7	89.0	82.7	68	77.9	1.0	1.3	1.3	2.2	1.88
"	Dec.-Jan.	774			378	1755	21			34	46.3	2.3	2.6	1.7	1.9	2.06
Ga.	Sept.	2388		1306	1912	804	62		73	74	66.5	2.1		1.8	1.9	1.68
"	Dec.-Jan.	2595	1530	647	469	613		12	7	12.6	3.3	1.5	2.2	1.2	1.5	1.98
Ky.	Sept.	888	1129		1154	4467	65.6	65.1		69.2	71.8	1.5*	1.3*		1.9	1.38
												1.9**	1.6**			
"	Sept.-Oct.			443					73.6					0.9*		
														1.9**		
La.	Dec.	424	469	726			42.5	35.4	35.4			1.9	1.7	1.1		
"	Dec.-Jan.				922	2742					38.4				1.8	2.10
Miss.	Sept.	1996	1044			1481	69.2	64.6			67.9		1.8	1.3		1.16
"	Oct.				536					54.8					1.2	
"	Dec.-Jan.					532					18.0					1.80
N. C.	Sept.	706	1943	962		2368	73.2	60.3	52.5		67.1	2.1	1.2	1.0		1.51
" "	Oct.				676					48					1.4	
S. C.	Sept.	108	4	480*	814	979	69.5		75*	77	84.7		2.1	1.8		1.81
				1051#					69.3#							
" "	Dec.-Jan.				964	144				74	---					1.52
Tenn.	Sept.	465	1542	1679	1354	6477	69.5	57.3	73	79.7	80.2	.53	1.6	1.3	1.9	2.05
"	Oct.	302	304	177	460	382	75.2	52.0	74	55.7	56.0	.49	1.1	1.2	1.7	1.70
Totals		11866	8729	8295	11370	34863										

* Biologists check.
** Warden check.
# Wings

TABLE 4

MOURNING DOVE WINGS ANALYZED FROM HUNTER BAGS
SEPTEMBER 1953

	Number of Unmolted Primaries Remaining																						
	ADULTS										JUVENILES											Grand	%
State	0	1	2	3	4	5	6	7	8	Total*	1	2	3	4	5	6	7	8	9	10	Total**	Total	Juv.
Ariz.										1,645											1,389	3,034	45.8
Ark.	2	1								11		2	2					1	1		6	17	35.3
Calif.		2	1	2	4	2	2	1		115		14	17	17	12	12	20	27	41	37	187	302	61.9
Ga.	14	32	44	34	10	4				312	8	98	102	77	56	61	60	44	30	37	618	930	66.5
Idaho	1	4	7	49	133	89	19	3	2	308		3	8	27	23	27	42	58	72	57	317	625	50.7
Ill.		1	4	2	2	1				45		11	20	19	18	18	18	15	13	9	141	186	75.8
Kan.	4	3	20	48	37	4				160		11	29	31	33	42	39	25	25	21	255	415	61.4
Ky.										685	77	127	212	236	263	311	282	208	25	4	1,745	2,430	71.8
Md.	19	35	17	1	2					284	11	112	110	132	88	107	56	43	28	8	695	979	71.0
Miss.	15	45	58	61	20	2				359	3	92	135	125	91	89	84	65	52	26	760	1,119	67.9
Mo.										144	6	24	55	52	59	64	80	33	26	13	412	556	74.1
Nev.			1	4	5	6				16					3	6	9	14	11	7	50	66	75.8
N. C.										96											196	292	67.1
Ore.			1	8	36	35	9	3		92			1		2	5	8	16	53	30	115	207	55.6
Pa.			1	3						4		1		1					1	1	4	8	50.0
S. C.										20	1	16	16	19	10	11	13	7	8	10	111	131	84.7
Tenn.										1,355	77	551	817	913	774	682	695	412	291	262	5,474	6,829	80.2
Utah										575											533	1,108	48.1
Va.	43	32	24	5	4					108	1	23	29	40	28	27	21	22	6	6	203	311	65.3
Wash.			4	69	144	72	12	5		306		7	29	43	56	67	82	69	49	29	431	737	58.5
Totals	98	155	182	286	397	215	42	12	2	6,640*	184	1092	1582	1732	1516	1529	1509	1059	732	557	13,642**	20,282	67.3

*Includes adults not aged by primaries.

**Includes juveniles not aged by primaries.

TABLE 5

MOURNING DOVE WINGS ANALYZED FROM HUNTER BAGS
OCTOBER 1953

Number of Unmolted Primaries Remaining

	ADULTS							JUVENILES										Grand	%
State	0	1	2	3	4	5	Total*	1	2	3	4	5	6	7	8	9	10	Total**	Total	Juv.
Ala.	22	10	3				357	102	117	132	147	108	87	63	37	20	10	823	1,180	69.7
Ariz.							23											39	62	62.9
Del.	12	20	9	7	2		50	2	10	12	7	7	8	5	11	1		63	113	55.8
Fla.North	22	25	16	6			205	3	90	96	96	73	58	45	41	9	8	519	724	71.7
" South	26	40	11	4			543	54	402	445	384	225	218	193	126	39	18	2,104	2,647	79.5
Tenn.							168	4	24	39	28	40	30	32	8	7	2	214	382	56.0
Va.	18	6		1			25		4	8	7	10	17	4	5	3	-	58	83	69.9
Totals	100	101	39	18	2		1,371*	165	647	732	669	463	418	342	228	79	38	3,820**	5,191	73.6

TABLE 6

DECEMBER 1953 and JANUARY 1954

Ala.	10	2					516											80	596	13.4
Fla.North							203	6	35	47	33	9	4					135	338	40.0
" South							147	5	42	45	31	24	11	4	4			166	313	53.0
Ga.	27	2					29			1								1	30	3.3
La.							962											600	1,562	38.4
Miss.	39	6					41	1	4	2	2							9	50	18.0
Totals	76	10					1,898*	12	82	95	66	33	15	4	4			991**	2,889	34.3

Table 7

BAG CHECKS FOR SEPTEMBER 1953*

	Doves Killed	Hours Hunted	No. of Hunters#	Kill Per Gun Hour
Pacific Flyway	9,384	4,096	1,661	2.29
Central Flyway	3,613	1,652	773	2.18
Mississippi Flyway	19,143	11,469	4,596	1.67
Atlantic Flyway	6,371	4,588	1,657	1.38
Totals	38,511	21,805	8,687#	1.76

Includes those seasons starting in September and continuing into October.

Does not include any state where less than 100 hunters were checked.

Table 8

HUNTER BAG COMPOSITION
1953-54 SEASON

(Four Southeastern States)

State and Date	Adults		Adults with Glandular Crop			Juveniles		Total Doves	No. of Bags
	No.	%	No.	% Adults	% Total Bag	No.	%		
Ala.									
10/17-31	552	45.7	4	.72	.33	652	53.9	1,208	236
12/27-1/10	502	85.9	2	.40	.34	80	13.7	584	271
Ky.									
9/1-30	420	31.4	38	9.00	2.80	919	68.6	1,339	461
N. C.									
9/15-29	700	38.6	20	2.90	1.10	1,112	61.4	1,812	428
Tenn.									
9/1-15	1,355	19.9	157	11.60	2.30	5,431	80.0	6,786	1,422
10/28-30	168	43.9	0	0	0	214	56.1	382	97
Totals	3,697	30.7	221			8,398	69.3	12,111	2,915

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1954 June

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Peachtree-Seventh Building
Atlanta 5, Georgia

ISSUE NO. 9 June 24, 1954

MOURNING DOVE NEWSLETTER
(Not for Publication)

A summary and analysis of the Mourning Dove populations is presented through the cooperative efforts of approximately 600 biologists, enforcement officers, students, and interested persons in 44 states and one province who ran 730 call-road counts between May 20 and June 10, 1954. Through their efforts in following a tested and standardized technique, an index to the breeding dove population was obtained to compare with a similar sample over many of the same routes in 1953. In Newsletter Number 7, June 29, 1953, the 1953 results were compared with 1952. Newsletter Number 8, April 1954, presented results of the dove hunter bag checks made in each of the 28 dove hunting states during the 1953-54 season, a summary of the juvenile-adult age ratio data, and wing aging analysis. This last issue might be consulted with the present one to provide information to the states and this Service in suggesting and promulgating dove hunting regulations for the coming 1954-55 season.

Since Newsletter Number 7 was distributed, many states have further curtailed their Mourning Dove investigations and the gathering of populations information. This is a backward step since the Cooperative Dove Study resulted in suggestions that each state continue four phases of dove investigations to assist in proper management of this important game bird; annual call-road count, random road counts monthly from July to January inclusive, hunter bag checks, and banding of nestlings and flying doves.

The conclusions are placed first for quick reference.

Conclusions

Considering the results of the call counts for the entire country, there is evidence of a small increase in the breeding population this year. This may indicate a leveling off of the steady increase experienced in the three previous years. While a significant change is apparent for only one (South Atlantic) of the seven individual areas into which the United States is divided, an increase becomes evident when the nation-wide data are analyzed. Information regarding doves observed on the call-road counts does not show a significant difference; however, this is not important because past investigations have shown these data to be extremely variable in comparison to counts of calling doves.

Analysis of Call-Road Count Data

The sampling technique employed during 1954 is consistent with previously established and standardized procedure; consequently, valid comparisons can be made. Inasmuch as this call-road count technique has been generally accepted and has been adequately described in previous Newsletters and elsewhere, comment regarding validity of the procedure is omitted herein to avoid repetition. Of

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the 730 call-road counts made in 1954, 432 were comparable, having been covered in both 1953 and 1954. Table 1 and the state lists of routes at the end of this Newsletter give the number of routes from each state. The comparable routes were divided into seven sections of the United States, based on recoveries of banded doves by hunters in the 28 dove-hunting states.

In order to utilize the available data to the fullest extent, fundamental statistical treatment has been applied. Analysis has not been carried out in great detail, but it is believed that the procedure is adequate for the purpose. This analysis involves both call counts and birds observed. Considering the comparatively small size of the sample and the importance of conclusions regarding the population changes, the 95% confidence level has been used in all significance tests.

Tables 2 and 3 present an analysis of samples from each of the seven sections of the United States as well as their differences in terms of the average number of doves heard and the average number of doves seen per route. Inspection of the averages for both censuses reveals an increase in the majority of the seven areas. However, computation of confidence bands at the 95% level indicates that the average figures, even though weighted, may not be highly accurate. The weakness of a simple average is that variation within the sample is not fully accounted for. In Table 2 the confidence band comparing 1953 with 1954 data for each section, except South Atlantic, contains zero and hence is not significant. All confidence bands in Table 3 contain zero, showing that the changes in the average number of birds seen is not significant.

Recognizing that analysis of area data alone could be faulty, further computations were made after grouping the data according to major sections and for the entire United States. Tables 4 and 5 show the results of these analyses. A comparison of the significance of the differences between these larger groups of data reveals that on the basis of doves observed the change is not significant, whereas the call count data indicate that an actual increase could have occurred. In Table 4 none of the confidence bands comparing the 1953 and 1954 data include zero, so they are significant at the 95% level. This indicates the value of the larger number of counts available when greater area is included. The total east of the Mississippi River consists of counts from states in the "Eastern Flyway" mentioned later in this Newsletter, while those in the North Central and South Central Sections of Tables 2 and 3 make up the "Central Flyway", and the routes in the Western Section comprise the "Western Flyway".

The lack of agreement of the significance tests with respect to doves seen and doves heard is not surprising because of the variability of the former data. Preliminary examination of the relationship between doves seen and doves heard indicates an absence of significant correlation. While additional sampling may not necessarily improve the confidence bands of future data, larger samples would strengthen the results of the analysis.

The Sources of Doves Taken by Hunters in the 28 Dove-Hunting States

Since the inception of the banding program in 1920, about 130,000 Mourning Doves have been banded in North America. During the 34 hunting seasons which have elapsed, there have been 2,983 recoveries of birds shot by hunters in the 28 states which had open seasons on doves last year. No recoveries are included from other states even though several more have had dove hunting at sometime during the 34 years. This represents 2.3 per cent recovered by hunters in the United States. Approximately 85,000 of the 130,000 doves were banded during the past five years, showing the influence of the Cooperative Mourning Dove Study

TABLE I
NUMBER OF CALL COUNT ROUTES FOR 1951, 1952, 1953, AND 1954

te	1951	1952	1953	1954	State	1951	1952	1953	1954
bama	10	8	21	20	Nebraska	1	4	10	2
zona			10	15	Nevada			12	15
ansas	4	2	6	7	New Jersey		3	6	7
lifornia			25	23	New Mexico			7	23
lorado				24	New York	4	4	12	11
necticut			1	1	North Carolina	6	7	18	18
laware		1	2	1	North Dakota	1	2	9	21
orida	10	9	24	20	Ohio	16	16	16	16
orgia	10	21	19	18	Oklahoma		5	6	10
aho		4	17	20	Oregon			7	13
linoi	1	2	29	32	Pennsylvania	3	5	15	15
diana	1	4	7	8	Saskatchewan			7	7
wa		3	11	17	South Carolina	8	9	16	24
nsas		7	20	34	South Dakota		5	4	3
ntucky	11	7	19	18	Tennessee		11	27	31
uisiana	13	7	23	25	Texas	12	7	10	46
ryland	3	3	5	4	Utah				18
ssachusetts			3	3	Virginia	2	5	11	9
chigan	1	6	23	16	Washington			12	19
nnesota		4	14	18	West Virginia			3	2
ssissippi	8	9	17	17	Wisconsin	3	7	18	16
ssouri	5	8	16	18	Wyoming				20
ntana		1	4	25					
					TOTAL	133	196	542	730

TABLE 2. Area Sample Analysis, Doves HEARD, 1953-54

	North Atlantic		South Atlantic		East Central		Midwest		North Central		South Central		Western	
	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954
Number of routes	35		60		89		70		68		40		68	
Average	12.4	14.9	17.0	22.9	21.3	24.9	23.0	24.6	29.6	32.2	28.8	30.6	32.2	31.3
Standard Deviation	13.0	14.7	11.45	16.58	12.40	16.20	20.06	17.96	19.63	18.90	26.73	28.4	27.90	27.88
Standard Error	2.20	2.48	1.48	2.14	1.31	1.72	2.40	2.15	2.38	2.29	4.23	4.49	3.38	3.38
Confidence Band, 95%	8.0--	9.9--	14.0--	18.6--	18.7--	21.5--	18.2--	20.3--	24.8--	27.6--	20.3--	21.6--	25.4--	24.5--
	16.8	19.9	20.0	27.2	23.9	28.3	27.8	28.9	34.4	36.8	37.3	39.6	39.0	38.1
Standard Error, Difference	3.31		2.60		2.16		3.22		3.30		6.17		4.78	
Confidence Band, 95%, Difference	-4.1---9.1		.7---11.1		-.7---7.9		-4.8---8.0		-4.0---9.2		-10.5---14.1		-8.7---10.5	

TABLE 3. Area Sample Analysis, Doves SEEN, 1953-54

	North Atlantic		South Atlantic		East Central		Midwest		North Central		South Central		Western	
	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954	1953	1954
Number of Routes	34		59		89		69		68		39		71	
Average	8.3	10.1	16.0	16.2	14.3	17.1	17.7	20.0	31.0	29.0	24.2	33.9	88.5	78.1
Standard Deviation	11.14	13.56	17.15	14.55	3.88	16.72	18.35	25.87	23.05	17.50	22.65	19.95	128.3	149.0
Standard Error	1.91	2.33	2.23	1.89	.41	1.77	2.21	3.17	2.81	2.13	3.62	3.20	15.22	17.7
Confidence Band, 95%	4.5--	5.5--	11.6--	12.4--	13.5--	13.5--	13.3--	13.6--	25.4--	24.8--	17.0--	27.5-	58.1	42.7--
	12.1	14.7	20.4	20.0	15.1	20.7	22.1	26.4	36.6	33.2	31.4	40.3	118.9	113.5
Standard Error, Difference	3.01		2.92		1.82		3.86		3.51		4.83		23.35	
Confidence Band, 95%, Difference	-4.2---7.8		-5.6---6.0		-0.8---6.4		-5.4---10.0		-5.0---9.0		-1.0---18.4		-36.3--57.1	

TABLE 4. Summary Analysis, Doves HEARD, 1953-54

	Total East of Miss. River		Total East of 100" Meridian		Total United States	
	1953	1954	1953	1954	1953	1954
Number of Routes	254		362		432	
Average	19.5	23.0	22.4	25.5	23.3	26.6
Standard Deviation	15.23	16.82	18.28	19.25	20.50	19.86
Standard Error	0.96	1.06	0.96	1.01	0.99	0.96
Confidence Band, 95%	17.6--	20.9--	20.5--	23.5--	21.3--	24.7--
	21.4	25.1	24.3	27.5	25.3	28.5
Standard Error, Difference	1.43		1.39		1.38	
Confidence Band, 95%, Difference	.7---6.3		.3---5.9		.5---6.1	

TABLE 5. Summary Analysis, Doves SEEN, 1953-54

	Total East of Miss. River		Total East of 100" Meridian		Total United States	
	1953	1954	1953	1954	1953	1954
Number of Routes	251		358		429	
Average	15.0	16.7	19.9	19.9	33.1	30.1
Standard Deviation	17.02	19.52	20.62	22.0	66.91	68.85
Standard Error	3.4	3.9	3.45	3.68	3.33	3.28
Confidence Band, 95%	8.2--	8.9--	12.9--	12.5--	26.5--	23.5--
	21.8	24.5	26.9	27.3	39.7	36.7
Standard Error, Difference	5.18		5.04		4.68	
Confidence Band, 95%, Difference	-8.7---12.1		-10.1---10.1		-6.4---12.4	

in the Southeastern States and in other participating states. Consequently, most of the recoveries have been received from these years of intensive banding, and more may be anticipated since some of these doves are still alive. The following table shows the states of banding for all doves taken in each of the 28 hunting states; this includes both direct and indirect recoveries.

Based upon an analysis of recoveries the United States has been divided into seven sections as shown by the map. Bar graphs in each section give the source of banding for doves which were killed by hunters in the states included within the section. These bar graphs indicate that a very high percentage of the recoveries are from doves banded in the same section of the country. This should not be interpreted as meaning that all of these doves originated (hatched) within that area since the greater number were banded as flying birds whose source can not be determined. Too few doves have been banded as nestlings to provide a clear picture of movements. This is a handicap in attempting to correlate origin and production with harvest.

Most of the Mourning Doves banded in the North Atlantic States migrate down the Atlantic Coast and are harvested mainly by hunters in the South Atlantic and East Central areas. A few go to the South Central section, while some are taken in the three North Atlantic States which permit hunting. Most of the doves banded in the South Atlantic States are recovered in the state of banding, while only 4 per cent of those recovered are shot in the East Central section and a very few in the Midwest and South Central areas. Birds banded in the 5 Midwest States furnish hunting to the South Atlantic, East Central, and South Central Sections, as well as to Illinois. These doves disperse southward, southeastward, and southwestward. Mourning Doves banded east of the Mississippi River not only provide sport to the hunting states on that side of the river, but a considerable number are harvested in the South Central States.

Contrariwise, doves banded west of the Mississippi River migrate south and southwest with only about 6 per cent of those recovered being taken east of the Mississippi. States in the South Central section take 70 per cent of the recoveries from North Central States, while 22 per cent are shot in the states of banding. The South Central States account for practically all of the recoveries from banding within that section. Western States take almost all of the recoveries from their own banding. Thus, the western states seem to be dealing with a dove population which seldom strays east of approximately the 100" Meridian. This Western section has taken only one dove banded outside its boundary, and it was from Texas.

A more thorough analysis of the recovery data will be made to provide further information on dove movements. Mourning Dove banding should be continued and even expanded, while hunters should be urged to report all recoveries.

Mourning Dove Flyways

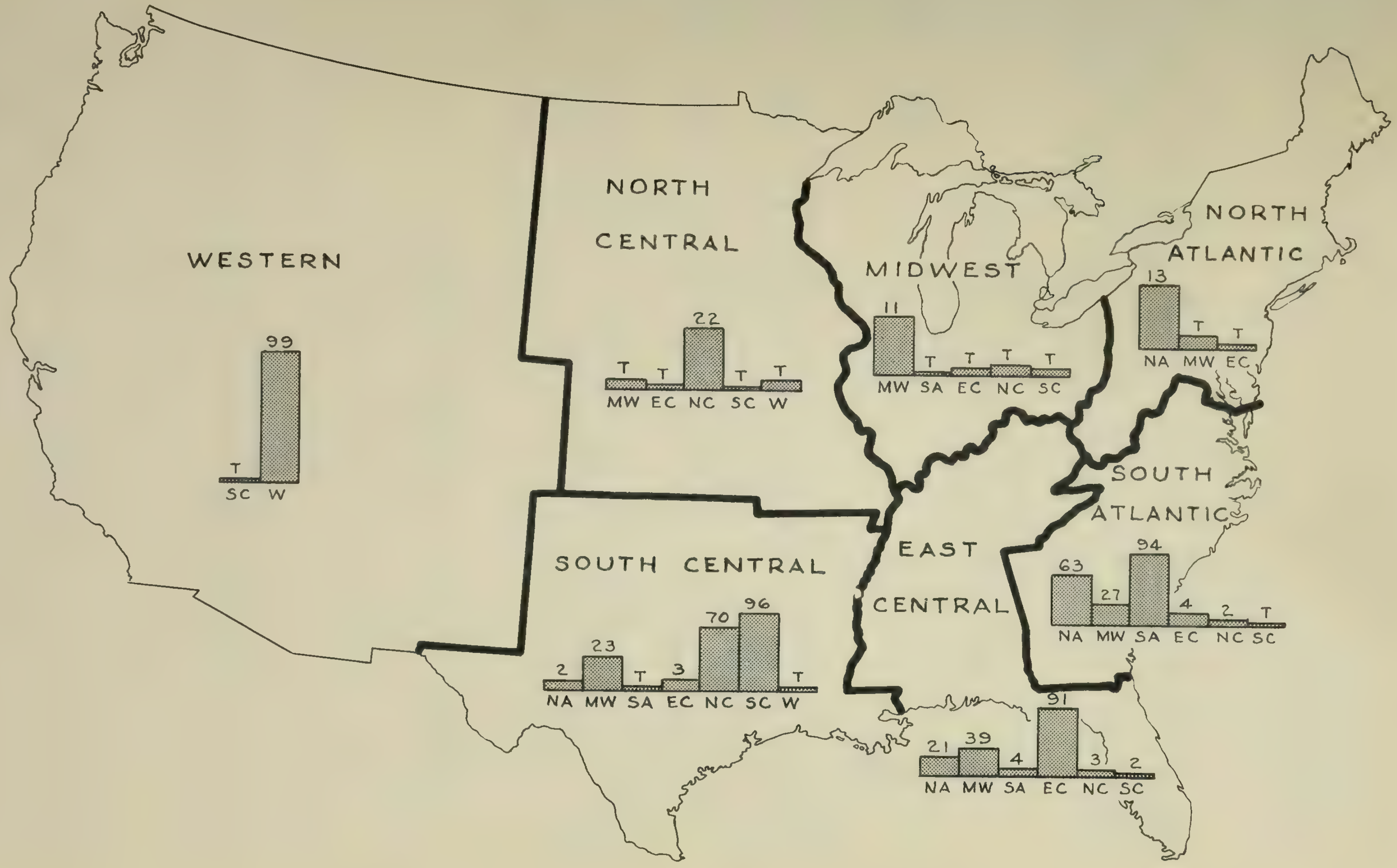
As brought out in the discussion of recoveries of banded doves by hunters, doves have major routes of migration. These have not been delineated by a sufficiently intensive analysis of the recoveries to indicate that doves follow distinctive flyways as waterfowl. However, since the doves in the 11 Western States seem least inclined to affect other sections of the country, these states might be considered a "Western Flyway".

SOURCES OF BANDED MOURNING DOVES TAKEN BY HUNTERS IN THE 28 DOVE HUNTING STATES
1920 -- 1953 INCL.

	Recovered in:																												
nded in:	Ala.	Ark.	Ariz.	Calif.	Colo.	Dela.	Fla.	Ga.	Idaho	Ill.	Kans.	Ky.	La.	Md.	Miss.	Mo.	Nev.	N. M.	N. C.	Okla.	Ore.	Pa.	S. C.	Tenn.	Texas	Utah	Va.	Wash.	Total
a.	159						10	13				1		1	2	2							3	4	1				196
iz.			100	2																								1	103
k.	2	10					1	1		2			2		2	1									13				34
lif.				138					1								1												140
lo.			19		3													1							1				24
nn.							2																						2
C.														2					1										3
a.	10						414	18		10		1	5		1				2				3		1				465
,	3						2	92		1													1						99
aho			2	1					2																				5
..	3						11	17		34		1	12		1									2	14				95
l.	6	1					11	7		2			6		2				2				1		6				44
va													1							3					17				21
ns.											2														6				8
.	6						2					60	2											3	2				75
.	1						4	1		3			162		4	1								1	36				213
n.							1																						1
														15									2						17
ss.	7					2	19	37					3	1					16				28	1			2		116
h.	11						20	19		1		1	8	1	3				5				3	2	10				84
nn.																									8				8
ss.	3	1					6			2			18		94										3				127
	1						3	3		2			2			26				3					21				61
r.													1												3				4
J.							1	4						1					4				3	1					14
M.																		2											2
Y.	2						7	11					1	2					4				4						31
C.	2						3	5											143				8		1		1		163
D.											1		2												12				15
o	21						20	22		1			12		1				2				8		7				94
a.											1									10					10				21
.								2																					2
.			3																		5					1		1	10
	1						5	9											5			5	5				2		32
.														1															1
C.	1						3	6											1				58						69
D.																				1					11				12
n.	4						3	2				1	1		3									76	1				91
.	1						1	1					1					1		2					429				436
h			1																							4			5
							2	2											1										5
Va.	1							1																					2
c.	4						8	5		1			4							1		1	2		7				33
ls	249	12	125	141	3	2	559	278	3	59	4	65	243	24	113	30	1	4	186	20	5	6	129	90	620	5	5	2	2983

ORIGIN OF DOVES TAKEN BY HUNTERS 1920-53

Expressed as Percentage of Recoveries from Section as Indicated


WESTERN
99
T
SC W
NORTH CENTRAL
T T 22 T T
MW EC NC SC W
MIDWEST
11 T T T T
MW SA EC NC SC
NORTH ATLANTIC
13 T T
NA MW EC
SOUTH ATLANTIC
63 27 94 4 2 T
NA MW SA EC NC SC
SOUTH CENTRAL
2 23 T 3 70 96 T
NA MW SA EC NC SC W
EAST CENTRAL
21 39 4 91 3 2
NA MW SA EC NC SC

Doves from the North Central and South Central States move mainly in the vast central part of the United States. This might be designated as a "Central Flyway". All of the states east of the Mississippi River could be grouped into an "Eastern Flyway". They furnish doves to each of the four sections into which Eastern United States has been divided, but also send a considerable number southwestward into the South Central States, and a few into the North Central section.

While we do not propose that Mourning Doves be handled on a flyway basis, it may be helpful to break down the 1954 call count results roughly into four categories of low (0-9), medium (10-29), high (30-59), and very high (60 and higher) depending upon the number of doves heard calling per route as shown in parenthesis. The "Western Flyway" has the largest percentage in the high and very high classes, while the Eastern Flyway has the lowest:

	Percentage in Low and Medium	Percentage in High and Very High	Total Number
Eastern Flyway	69.8%	30.2%	281
Central Flyway	63.9%	36.1%	258
Western Flyway	59.6%	40.3%	124
			663

It may be recalled that bag check data as given in Mourning Dove Newsletter Number 8 (April 1954) showed a higher kill-per-gun-hour in Pacific Flyway states which became progressively lower eastward to the Atlantic Flyway, which was lowest. In that analysis the states were divided into the four flyways used for waterfowl management. Thus it appears the western states may have higher dove populations which result in greater hunter success.

The "Eastern Flyway" when broken up into three major life zones, Transition, Carolinian, and Austroriparian, provide some information on changes in breeding population from 1953 to 1954 as shown by call count results. Each of the three life zones showed a shifting to higher percentages in the high and very high categories:

	1953 Percentages		1954 Percentages	
	Low and Medium	High and Very High	Low and Medium	High and Very High
Transition	97.1%	2.9%	88.4%	11.5%
Carolinian	75.7%	24.3%	63.1%	36.9%
Austroriparian	82.6%	17.4%	77.1%	22.8%

While these have not been statistically analyzed, further study and analysis of Mourning Dove populations may furnish a basis for distributing the call counts on the abundance of doves in order to provide a more satisfactory understanding of fluctuations from year to year.

Random Road Counts

During the recent Cooperative Dove Study many states made random road counts on a monthly basis and found that valuable information could thus be obtained on production, migration, and winter concentrations. Many of these road counts have been summarized in previous Newsletters to give helpful populations data. Unfortunately, most states have discontinued these counts

so that little comparative information is available for this Newsletter. Two of the East Central states have contributed random road count figures which are worth inclusion.

Alabama found 6.7 doves per 100 miles in 6,119 miles during April 1953, and 7.1 doves per 100 miles in 20,072 miles during April 1954; 9.6 doves per 100 miles in 8,223 miles during May 1953, and 11.99 doves per 100 miles in 26,148 miles during May 1954.

Tennessee found 14.5 doves per 100 miles in 38,128 miles during May 1953 and 21.6 doves per 100 miles in 31,372 miles in May 1954.

Disease

In 1950 many Mourning Doves died of trichomoniasis, especially in Alabama and other Southeastern States. Each summer since then some cases of this disease have been reported from many of the Eastern and Southeastern States, but never in alarming numbers to approach the 1950 epidemic. Possibly the disease may be of annual occurrence sufficient to swell to dangerous levels under favorable conditions. Reports have been received of trichomoniasis from several Southeastern States this year, being heaviest in Alabama. Further evidence of the disease should be reported to the state game departments and to the Wildlife Disease Laboratory, Patuxent Research Refuge, Laurel, Maryland.

Plans and Suggestions for Securing Additional Dove Information

The call-road count technique for securing an index to the Mourning Dove breeding population was developed, tested, and standardized by the cooperation of many individuals with the Branch of Wildlife Research. For the past four years the call-road count has been handled through this Branch, but this year, for the first time, it was turned over to the Branch of Game Management as an operational procedure. The Branch of Game Management sent out instructions and field data forms to each individual who made call counts in 1953 with a request to repeat the identical route any morning between May 20 and June 10. Additional routes were requested from a number of states to provide better coverage of different life zones and ecological habitats, while three new states were asked to make counts. The details of this cooperative effort were assigned to the supervising Game Agent in each state in cooperation with the state game department. Each cooperator was asked to send the field data forms directly to the Atlanta office immediately upon completion, but in no case later than June 10. Failure to follow this instruction made some forms arrive too late for inclusion in this Newsletter, but we have been able to utilize all forms which were received through June 17. All of the summarizing, analyzing, compiling, and producing of this Newsletter was done in the Atlanta office before June 24.

Next year the present intention is to ask each 1954 cooperator to repeat the identical route. Instructions and field data forms will again be distributed by Game Agents in conjunction with state game departments. Probably the completed field data sheets will be sent to our five regional offices for summarizing before transmittal to Washington where the national analysis will be made by the Branch of Game Management. Some plans have been made to increase coverage of life zones and various ecological habitats based upon field research on varying density of breeding doves.

Until dove hunter bag checks can be planned on a statistically sound or randomized basis, no concerted effort may be made to secure bag checks in all of the dove hunting states next season. However, many states will conduct bag checks and thus secure valuable information on the hunter success, juvenile-adult ratio, etc.

Banding of nestling and flying doves should be encouraged in order that recoveries may be secured by hunters and from other sources. Much of the present knowledge of dove movements is based on band recoveries; if doves are not banded, there can be no recoveries. Operation of permanent banding stations in good dove nesting, migration, and concentration habitats is very important.

Random roadside counts have been found to provide helpful information if 5,000 to 15,000 miles per month can be secured in a state. Since this type of count may be made in conjunction with regular assigned duties and thus entails no additional expense, many states may wish to revive this procedure. Such counts are especially valuable in the months from July to January, inclusive.

The conclusions of the Cooperative Dove Study stress the importance of the above four methods of securing information on the populations of Mourning Doves. The call-road count alone will not enable the states and this Service to detect changes in dove production and the numbers of birds available to the hunter. It serves only as an index to the breeding population and a safety check on the long-time trend in dove populations. It does not provide needed information on nesting success, production, or fall populations, which can be secured by the random road count. The bag check will furnish data on hunter success and juvenile-adult ratio. Banding is necessary to continue to provide definite information on movements, longevity, and similar problems. Only through a continued and well-rounded program of dove research and management will the Mourning Dove continue to furnish recreation, sport, and enjoyment.

Acknowledgements

Approximately 600 persons have cooperated to gather the data reported upon in this Newsletter. We wish to thank each of these cooperators for their contributions, and a copy of this Newsletter is being mailed to every person who provided a satisfactory mailing address.

This Newsletter was compiled by Harold S. Peters and Mrs. Joan H. Wolfe, Branch of Wildlife Research. The statistical analysis was made by Edward E. Hueske, Branch of Federal Aid; William C. Ashe, Branch of Lands; and Leonard E. Foote, Wildlife Management Institute.

Summary of Routes by States

The following tables give results of each route used in analyzing the call counts in every participating state. These are listed by the assigned state route number and show the county of location and the number of doves heard and seen in both 1953 and 1954. A number of new routes were established this year, and consequently lack comparable figures for 1953. Also, some 1953 routes were not covered this year and are not listed. A few cooperators failed to follow the standardized instructions, and their counts could not be included in this summary. These explanations will serve to account for missing route numbers in the state tables. Each acceptable count began one-half hour before local official sunrise and required two hours. The route was 20 miles long, with stops each mile for three-minute intervals. During the 20 stops the number of doves heard calling were tabulated. Records were kept of doves seen while driving between stations and while at the stations, the number of doves listed being the total observed during the two-hour call-road count.

ALABAMA

County	Heard		Seen	
	1953	1954	1953	1954
Houston	26	28	21	12
Baldwin	38	27	5	11
Tuscaloosa	6	14	3	12
Montgomery	22	43	18	18
Randolph	8	16	8	7
Colbert	11	20	8	17
Etowah	29	31	8	24
Montgomery	31	53	29	9
Montgomery	40	21	9	10
Montgomery	26	27	6	8

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
17	Morgan	44	53	25	6
18	Limestone	38	27	20	8
19	Baldwin	20	43	9	22
20	Mobile	16	31	7	7
22	Butler		22		3
23	Barbour		26		10
24	Marengo		18		10
25	Clarke		28		7
26	Limestone		30		30
27	Jackson		55		63

ARIZONA

County	Heard		Seen	
	1953	1954	1953	1954
Graham	42	36	218	152
Graham	58	71	38	32
Pima	30	17	42	35
Maricopa	66	54	362	436
Maricopa	67	63	308	543
Maricopa	36	40	398	228
Maricopa	21	23	11	13

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
9	Maricopa	27	29	232	39
10	Pima	28	56	33	30
11	Greenlee		41		111
12	Yavapai		8		12
13	Coconimo		10		1
14	Yuma		32		123
16	Maricopa		30		20

ARKANSAS

County	Heard		Seen	
	1953	1954	1953	1954
Arkansas	40	13	45	40
Arkansas	55	29	33	111
Craighead	36	53	90	120
Craighead	49	46	39	72

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
5	Ouachita	14	11	27	59
6	Ouachita	13	10	32	38
7	Arkansas		20		76

CALIFORNIA

County	Heard		Seen	
	1953	1954	1953	1954
Los Angeles	36	19	39	54
Los Angeles	23	35	42	77
Sutter	15	18	27	21
Humboldt	11	14	69	15
Modoc	19	5	15	29
Tehama-Shasta	76	54	37	12
Imperial	50	57	372	283
Imperial	33	35	484	196
Imperial	21	45	622	270
Riverside	29	26	133	364
Ventura	127	62	48	26

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
13	Los Angeles	44	30	107	63
14	Colusa	14	49	74	40
16	Sacramento	8	0	0	16
17	Modoc	22	32	7	11
18	Merced	8	15	23	29
19	Imperial	112	99	459	1023
26	San Bernardino		32		73
27	San Bernardino		59		20
28	Imperial		31		27
29	Riverside		7		8
30	Sacramento		32		108

COLORADO

	Heard		Seen		Rt.		Heard		Seen	
County	1953	1954	1953	1954	No.	County	1953	1954	1953	1954
Crowley		47		101	15	Larimer		86		29
Conejos		3		24	16	Phillips		35		1
Alamosa		2		15	17	Yuma-Washington		6		0
Otero		65		145						
Bent		25		122	18	Yuma		3		7
Prowers		20		98	19	Garfield		31		39
Moffat		11		3	20	Mesa		29		58
Douglas		40		8	21	Montrose		31		25
Larimer-Weld		29		10	22	Montezuma		26		17
					23	Boulder		15		21
Weld		1		3						

CONNECTICUT

	Heard		Seen		Rt.		Heard		Seen	
County	1953	1954	1953	1954	No.	County	1953	1954	1953	1954
Hartford	5	0	1	0						

DELAWARE

	Heard		Seen	
County	1953	1954	1953	1954
Kent	28	29	12	7

FLORIDA

	Heard		Seen		Rt.		Heard		Seen	
County	1953	1954	1953	1954	No.	County	1953	1954	1953	1954
Dade	29	12	11	5	13	Washington	9	13	0	8
Charlotte	29	21	2	4	14	Walton	5	8	6	0
Lee	0	6	0	0	15	Santa Rosa	18	11	9	3
Highlands	18	18	12	11	16	Franklin	23	34	14	81
Polk	25	26	3	5	17	Leon	21	24	17	28
Marion	7	11	0	0	18	Levy-Marion	27	19	40	29
Lafayette	28	12	9	5	19	Levy-Alachua	29	13	43	19
Volusia	14	16	0	4	20	Polk	32	12	14	12
Gadsden-Leon	13	15	7	3	21	Orange	26	21	12	14
Bay	0	1	0	0	22	Alachua(1)	7	7	1	4

GEORGIA

	Heard		Seen	
County	1953	1954	1953	1954
Oconee	18	29	21	32
Walker	21	16	7	7
Union	12	9	5	6
Bartow	32	23	11	10
Franklin	38	39	32	21
Spalding	21	18	4	7
Lincoln	17	19	0	10
Taylor	23	9	20	10
Washington	21	15	0	17

Rt.		Heard		Seen	
No.	County	1953	1954	1953	1954
10	Laurens	17	6	2	37
11	Bulloch	7	23	3	6
12	Randolph	31	18	3	69
13	Decatur	15	12	5	12
14	Camden	0	5	0	0
15	Lowndes	11	2	4	0
16	Bibb-Monroe	9	45	5	2
17	Dodge-Pulaski	8	12	7	14
18	Chatham-Bryan	5	8	0	1

IDAHO

	Heard		Seen	
County	1953	1954	1953	1954
Bingham	6	6	19	21
Power (1)	27	24	21	11
Bannock	7	21	10	1
Caribou	12	13	17	32
Nez Perce	38	94	32	28
Nez Perce	8	26	7	29
Ada-Canyon	46	33	191	24
Ada-Canyon	16	15	16	24
Nez Perce	28	53	42	11
Nez Perce	57	37	55	53

Rt.		Heard		Seen	
No.	County	1953	1954	1953	1954
14	Jefferson	6	4	44	46
15	Bonneville	10	9	51	49
16	Canyon	22	38	-	28
17	Bear Lake		3		10
18	Franklin		6		5
20	Jerome-Gooding		63		26
21	Boise		1		2
22	Bonner-Kootenai		17		0
23	Benewah		17		3

ILLINOIS

	Heard		Seen	
County	1953	1954	1953	1954
Cooke-Lake	24	15	6	20
Lake	11	16	-	12
Williamson	27	47	21	38
Williamson	57	40	34	23
Ogle	27	18	5	12
Ogle	20	27	7	13
Hancock	37	48	43	54
Marshall-Putnam	8	6	5	8
Fulton-McDonough	61	23	55	49
Union	23	19	8	22
Macon	3	3	21	14
Ogle	6	0	8	5
Washington	33	41	27	27
Lawrence	35	34	52	53
Champaign	2	1	10	7
Whiteside	4	15	5	12

Rt.		Heard		Seen	
No.	County	1953	1954	1953	1954
17	Madison	6	9	14	28
18	Madison-Jersey	4	15	21	24
19	DeKalb	0	3	3	3
20	Mason	64	22	122	44
21	Mason	75	31	120	34
22	St. Clair	39	12	26	23
23	St. Clair	1	1	7	23
24	St. Clair-Monroe	24	32	14	79
25	Lee	4	5	6	8
26	Lee	16	15	13	7
27	St. Clair	12	11	23	23
30	Winnebago		15		8
31	Winnebago		31		3
32	St. Clair-Madison		34		17
33	Tazewell		28		37
34	Knox		7		17

INDIANA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Daviess	29	66	43	172
Daviess	38	55	75	138
Lawrence-Orange		46		43

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
9	Jackson		68		75
10	Newton		23		9
11	Newton		41		26

IOWA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Clay	11	18	11	23
Winnebago	34	15	18	21
Worth	23	26	30	11
Story	17	30	41	18
Boone	41	32	20	13
Emmet	30	25	60	40
Emmet	22	36	43	33
Polk-Dallas	19	40	45	24

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
10	Mills-Fremont	46	68	40	27
11	Lee	59	63	69	61
12	Bremer-Fayette		14		10
13	Chickasaw-Bremer		11		7
14	Clay		26		11
16	Clarke-Decatur		82		54
17	Kossuth		11		24

KANSAS

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Reno	48	15	53	47
Sedgwick	29	52	81	98
Barton	19	22	62	46
Saline	81	32	63	101
Shawnee	20	28	19	23
Montgomery	5	39	27	50
Cloud	92	38	52	57
Marshall	65	19	43	60
Lyon	15	57	41	49
Crawford	18	17	25	25
Barber	12	14	25	14
Linn	27	49	41	38
Franklin	27	30	39	33
Russell	61	73	65	44
Barton	64	55	87	64
Finney	9	10	2	0
Finney	36	29	42	29

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
20	Pratt	17	31	54	44
21	Cherokee		31		61
22	Bourbon		34		27
23	Atchinson		39		27
24	Sherman		6		0
25	Morton		3		15
26	Greeley		1		0
27	Pottawatomie		28		33
28	Marion		66		93
29	Clay		77		46
30	Smith		38		38
31	Hodgeman		2		7
32	Graham		24		24
33	Ford		0		14
37	Greenwood		12		18
38	Hamilton		15		12
39	Meade		15		9

KENTUCKY

County	Heard		Seen	
	1953	1954	1953	1954
Hickman	29	41	27	68
Graves	33	31	26	21
Christian	15	37	6	32
Warren		23		45
Adair	14	12	7	20
Shelby-Spencer	31	61	38	39
Carroll-Henry-Trimble	27	14	4	4
Bourbon	9	16	3	0
Jackson	3	9	0	5

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
12	Morgan	21	10	2	0
13	Lawrence	2	1	0	2
14	Calloway	24	34	22	36
15	Calloway	33	24	35	42
16	Henderson	16	31	27	63
17	Henderson		37		44
18	Trigg-Lyon	20	13	5	6
19	Trigg-Lyon	3	15	13	23

LOUISIANA

County	Heard		Seen	
	1953	1954	1953	1954
Sabine-Vernon	22	29	9	6
Webster-Claiborne	28	26	23	16
Acadia	5	4	3	5
Acadia	4	3	6	2
E.Baton Rouge-Iberville	6	20	4	9
W.Baton Rouge-Iberville	14	18	3	1
E.Feliciana	11	4	5	2
Tangipahoa	18	17	5	13
Concordia	21	33	38	41
Caldwell-Ouachita	36	8	11	14
Rapides	18	32	2	3
Rapides	19	21	12	17
Vernon-Natchitoches	35	37	13	11

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
14	Natchitoches	39	63	9	6
15	Lafayette	10	21	26	54
16	Lafayette	20	14	30	64
17	Morehouse	15	26	4	13
18	W.Baton Rouge	13	14	22	22
19	Terrebonne	12	17	18	22
20	Rapides	61	33	21	36
21	Rapides	39	29	14	29
24	Grant		34		32
25	Vernon	27	38	14	8
26	Lafayette-St.Martin		44		142
27	Lafayette-St.Martin		36		121

MARYLAND

County	Heard		Seen	
	1953	1954	1953	1954
Pr. George	16	28	4	19
Washington	1	15	6	52

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
4	Howard	6	21	30	30
5	Pr. George	37	68	54	13

MASSACHUSETTS

County	Heard		Seen	
	1953	1954	1953	1954
Essex	11	5	15	10
Plymouth-Bristol	0	13	0	18

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
3	Bristol	0	0	2	0

MICHIGAN

County	Heard		Seen	
	1953	1954	1953	1954
Washtenaw	24	17	14	7
Washtenaw	16	42	10	29
Tuscola	0	7	2	4
Tuscola	5	0	3	1
Monroe	13	37	16	9
Ingham	20	9	5	4
Monroe	33	7	5	12
Bay	21	29	5	2

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
11	Newaygo	25	30	3	4
12	Newaygo	16	30	3	5
14	Kalamazoo	22	26	9	14
15	Kalamazoo	19	27	9	6
21	Isabella(4)	12	9	19	16
23	Isabella(6)	5	25	16	29
24	Allegan		11		9
25	Calhoun		2		4

MINNESOTA

County	Heard		Seen	
	1953	1954	1953	1954
Jackson	38	37	16	23
Jackson	45	33	29	21
Nobles	33	31	22	25
Nobles	28	35	16	30
Olmsted	12	22	13	14
Olmsted	12	39	11	8
Scott	22	39	15	16
Polk-Red Lake	22	20	14	9

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
9	Beltrami	17	10	9	2
10	Dakota	37	38	25	18
11	Ottertail	35	38	37	13
12	Dodge	23	29	9	19
13	Olmsted	11	23	11	9
15	Pope		1		11
17	Roseau		26		2

MISSISSIPPI

County	Heard		Seen	
	1953	1954	1953	1954
Issaquena	24	18	20	10
Warren-Yazoo	18	22	4	5
Rankin	41	40	7	12
Lafayette	4	21	13	7
Stone	26	31	1	1
Stone	16	5	5	0
Issaquena-Warren	9	11	16	12
Washington-Issaquena	11	14	31	26
Warren-Claiborne	12	5	18	1

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
13	Lafayette	2	4	9	15
14	Washington	32	28	13	10
15	Washington	21	31	16	7
16	Hinds-Madison	14	33	7	18
17	Rankin	22	31	22	0
18	Kemper		42		8
19	Jones		7		0
20	Choctaw		21		6

MISSOURI

County	Heard		Seen	
	1953	1954	1953	1954
Boone	51	49	81	47
Boone	50	54	78	29
Callaway	35	21	46	37
Cole	41	28	15	25
Cape Girardeau	43	29	27	31
Cape Girardeau	14	27	12	36
Howell-Douglas	13	11	2	9
Texas	9	17	10	1
Green	16	16	52	23

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
10	Green	16	12	30	25
11	St.Charles	26	9	32	33
12	St.Charles	25	7	22	28
13	DeKalb-Daviess	42	63	44	29
14	Daviess	30	31	65	42
15	Lawrence	34	73	77	68
16	Lawrence	11	52	29	29
17	Marion		16		80
18	Marion		33		105

MONTANA

County	Heard		Seen	
	1953	1954	1953	1954
Yellowstone	24	4	11	4
Lewis-Clark	1	2	4	19
Valley		1		6
McCone		27		6
Phillips		70		13
Phillips		92		6
Phillips		30		7
Sheridan		3		2

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
12	Sheridan		4		4
13	Sheridan-Roosevelt		6		9
14	Beaverhead		15		15
15	Ravalli		0		14
16	Powell		4		10
17	Lincoln		0		2
26	Lewis-Clark		0		0
27	Toole		14		5
28	Pondera-Toole		4		0
31	Richland		28		43
33	Hill		20		11
35	Sweet Grass		37		16
38	Musselshell		28		34
39	Big Horn		66		119

NEBRASKA

County	Heard		Seen	
	1953	1954	1953	1954
Adams	21	4	42	29

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
5	Hamilton	82	74	89	47

NEVADA

County	Heard		Seen	
	1953	1954	1953	1954
Churchill	14	11	66	51
Clark	32	46	38	40
Clark-Mohave, Ariz.	40	26	28	40
Elko	0	23	26	8
Elko	3	15	20	8
Lyon	17	17	17	7
Lincoln	6	119	683	40

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
12	Pershing	20	1	83	30
15	Elko		13		9
16	Washoe		12		6
17	Lincoln		3		5
18	Lyon		7		0
19	White Pine		1		41
20	Lincoln		56		22

NEW JERSEY

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954	Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Sussex	4	4	1	1	7	Salem		22		5
Sussex	3	7	1	0	8	Burlington		8		7
Cumberland	3	6	12	3						

NEW MEXICO

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954	Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Bernalillo-	27	37	51	18	12	Chaves		32		11
Valencia					13	Taos		22		32
Bernalillo-	9	15	7	1	14	Rio Arriba		10		1
Sandoval-					15	Rio Arriba		13		44
Santa Fe					16	Socorro		39		16
Grant	93	68	131	13	17	Valencia-		43		134
Grant	81	75	52	44		Socorro				
Dona Ana	14	6	42	62	18	Valencia		16		14
San Miguel		38		20	19	Chaves		10		2
San Miguel		30		7	20	San Miguel		0		1
Chaves		1		6	21	San Miguel		0		5
Chaves		0		10	22	Union		0		0
					23	Union		25		19
					24	Roosevelt		32		3
					25	Roosevelt		10		2

NEW YORK

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954	Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Niagara	34	36	20	14	6	Seneca	14	6	5	7
Niagara	34	27	15	11	7	Suffolk	49	33	15	1
Orleans-	34	24	8	7	8	Jefferson	23	16	0	0
Genesee					9	Herkimer	8	0	0	0
Wayne	42	50	33	47	10	Albany	4	12	1	0
Seneca	6	5	6	6	13	Wayne		21		5

NORTH CAROLINA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954	Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Johnston	29	52	35	27	10	Macon	2	3	0	0
Davidson	25	32	30	27	11	Wake	18	16	30	15
Macon	8	9	2	6	12	Robeson	22	15	2	7
Wake	12	14	21	16	13	Cabarrus	40	35	15	29
Robeson	21	27	5	5	14	Rowan	33	67	70	49
Pitt-Martin	16	11	2	16	15	Currituck	11	10	11	12
Martin	29	16	14	8	16	Dare	2	6	4	10
Johnston	15	49	18	23	17	Beaufort	5	17	41	5
Iredell	36	54	26	39	18	Martin-Beaufort	1	19	22	7

NORTH DAKOTA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Burleigh	33	83	26	39
Burleigh	60	78	15	35
Stutsman	11	12	33	35
Stutsman	4	23	6	14
McHenry	6	6	11	4
Renville	6	9	0	4
Ward	6	8	4	6
Ward		16		2
Burke		5		3
Burke-Ward		3		1
Williams		0		2

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
17	Williams		2		8
18	Walsh-Pembina		4		4
19	Walsh		4		10
20	Sargent		30		30
21	Ward		3		10
22	Mountrail		4		10
23	Stark		10		25
24	Golden Valley		8		20
25	Kidder		20		28
26	Sheridan		20		28

OHIO

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Ottawa	12	19	13	5
Franklin	18	7	10	14
Franklin	22	30	20	13
Franklin	31	17	17	17
Franklin	12	11	9	15
Franklin	12	16	15	14
Franklin	30	41	24	18
Franklin	24	26	6	15
Franklin	13	22	14	17

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
10	Pickaway-Ross	7	11	36	32
11	Athens	25	10	2	4
12	Wood	4	6	19	24
13	Wood	3	11	18	4
14	Wood	1	27	21	21
15	Wood	0	13	23	11
16	Champaign	33	39	11	16

OKLAHOMA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Oklahoma-Canadian	5	17	6	11
Tulsa-Rogers	7	5	11	5
Pittsburg-Latimer	9	14	17	22
Caddo		29		15
McIntosh		16		20

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
10	Kingfisher		24		88
11	Alfalfa		20		39
12	Grady		5		7
14	Greer		38		54
15	Love		29		13

OREGON

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Umatilla	10	9	30	36
Jackson	8	11	1	34
Umatilla	52	59	32	31
Yamhill-Polk	7	12	30	12
Klamath	87	13	11	8
Linn		8		3

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
9	Douglas		13		0
12	Grant		59		39
14	Harney		2		9
15	Malheur		3		18
16	Lake		57		2

PENNSYLVANIA

County	Heard		Seen	
	1953	1954	1953	1954
Centre	18	19	1	0
Centre	1	7	0	0
Centre	1	5	2	3
Elk	1	2	0	1
Elk-Jefferson	0	4	2	1
Lycoming-Clinton	4	3	3	3
Allegheny-Butler	6	10	4	4

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
10	Franklin	6	16	4	3
11	Lancaster	15	8	7	42
12	Lancaster	13	10	3	29
13	York	7	9	9	13
14	Perry	4	12	1	4
15	Perry	1	6	0	2
16	Indiana		5		0
17	Indiana		4		5

SASKATCHEWAN

Area	Heard		Seen	
	1953	1954	1953	1954
Lat.50°45' Long.104°55'	30	47	4	14
Lat.53°12' Long.105°56'	19	5	5	0
Lat.52°3' Long.106°40'		2		0
Lat.51°48' Long.106°40'		11		0

Rt. No.	Area	Heard		Seen	
		1953	1954	1953	1954
10	Lat.49°14' Long.107°43'		28		2
11	Lat.53°23' Long.105°47'		5		3
12	Lat.51°48' Long.106°40'		45		8

SOUTH CAROLINA

County	Heard		Seen	
	1953	1954	1953	1954
Anderson	3	12	77	26
Pickens-Oconee	6	4	40	14
Oconee	4	12	46	15
Anderson	7	25	-	26
Richland	8	30	12	11
Richland	15	17	2	7
Laurens	34	50	14	14
Aiken	12	51	9	17
Charleston	13	11	4	1
Charleston	4	7	0	0
Edgefield	19	20	10	10
Edgefield	18	30	6	8

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
13	Charleston	21	18	3	3
14	Dorchester	10	12	1	1
15	Richland	17	61	12	34
16	Lexington	63	60	40	63
17	Florence		108		7
18	Horry		13		5
19	Chesterfield		50		15
20	Chesterfield		83		5
21	Cherokee		8		38
22	Clarendon		19		2
23	Georgetown		7		0
24	Colleton		17		8

SOUTH DAKOTA

County	Heard		Seen	
	1953	1954	1953	1954
Brown	20	22	73	70
Brown	16	25	49	67

Rt. No.	County	Heard		Seen	
		1953	1954	1953	1954
7	Corson		65		22

TENNESSEE

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Madison	17	16	26	19
Lake	16	19	10	23
Lake	20	76	13	33
Henry	49	56	22	23
Henry	72	73	13	73
Stewart	12	6	6	7
Stewart	17	16	17	26
Sumner	15	18	8	9
Sumner	10	8	13	20
Maury	38	54	66	56
Maury	32	61	14	42
Davidson-Wilson	28	58	54	42
Davidson-Wilson	18	45	9	53
Lawrence	30	37	20	9
Coffee	35	22	33	18

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
17	McMinn	39	45	21	9
18	Bradley	34	16	15	14
19	Blount	9	16	7	2
20	Blount	12	22	7	7
21	Davidson-Cheatham	22	31	20	19
22	Davidson-Robertson	21	28	18	28
23	Shelby	36	30	13	15
24	Shelby-Tipton	44	20	29	17
25	Blount	11	26	30	25
26	Knox	14	26	3	19
27	Knox	10	21	5	15
28	Madison		17		23
29	Benton		37		24
30	Benton		14		14
31	Putnam		43		20
32	Overton		36		14

TEXAS

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Wise	23	14	28	47
Wise	10	24	9	41
Robertson	24	65	15	64
Robertson	42	69	49	78
Chambers	26	30	59	63
Chambers	25	31	14	34
Bosque	44	41	33	57
Wilson	127	133	90	126
Wilson	128	133	75	164
Victoria		45		63
Harris		28		31
Brazoria		29		44
Hidalgo		36		154
Chambers		17		52
Travis		18		9
Titus		13		49
Kleberg		83		380
Val Verde		28		26
Throckmorton		32		59
Throckmorton		75		134
Lubbock		0		5
Lubbock		3		0

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
27	Webb		34		82
28	Jefferson		24		12
29	Bexar		34		96
30	Nolan		0		44
31	Wise		55		31
32	Childress		27		23
33	Childress-Hall		17		20
34	Hemphill		52		29
35	Hemphill		10		41
36	Randall		39		21
37	Randall		15		12
38	Potter		3		32
39	Potter		1		42
40	Taylor		33		58
41	Taylor		84		73
42	Jefferson		23		33
43	Roberts		15		51
44	Roberts		3		19
45	Tom Green		55		83
46	Tom Green		72		122
47	Willacy		125		84

UTAH

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Box Elder		9		6
Tooele		37		12
Duchesne		19		1
San Juan		0		76
Carbon-Emery		15		1
Kane		76		26
Iron		22		60
Millard		18		17

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
15	Salk Lake		37		25
16	Juab		23		26
17	Juab-Millard		84		98
18	Beaver		24		24
19	Garfield		15		0
20	Garfield-Wayne		1		0
21	Sanpete		78		122
22	Beaver		50		77

VIRGINIA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Alexandria-Fairfax	11	8	15	14
Fairfax	14	25	9	6
Westmoreland	23	40	43	8
Nansemond-Isle of Wight	18	14	29	24

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
6	Nansemond-Isle of Wight	14	20	17	51
7	Campbell	27	22	11	15
8	Southampton	24	28	38	32
11	Montgomery	3	6	3	1
12	Accomack		5		3

WASHINGTON

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Spokane	16	7	14	4
Douglas	30	67	19	24
Spokane	0	10	1	5
Whitman	42	69	47	63
King	2	5	0	0
Okanogan	39	50	70	85
Skagit	0	2	0	2
Yakima	91	56	171	133
Yakima	39	36	100	82
Yakima	52	39	137	103

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
12	Yakima	68	55	144	66
13	Ferry		46		2
14	Stevens		22		0
15	Mason		0		0
16	Thurston		0		0
17	Douglas		44		101
18	Chelan		25		72
19	Okanogan		47		70
20	Okanogan		26		22

WEST VIRGINIA

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Hampshire	0	2	8	11

Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
2	Mason	11	9	3	2

WISCONSIN

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954	Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Dane-Columbia	38	34	0	23	9	Sauk	53	32	3	0
Columbia	-	45	-	8	10	Waushara	-	59	-	8
Iowa	37	42	1	0	11	Columbia	-	44	-	0
Green	34	54	25	14	12	Dane	26	34	6	2
Dunn	118	90	9	4	13	Adams	20	51	16	8
Dunn	59	74	17	22	17	Winnebago	7	9	1	2
Adams	37	38	6	11	18	Winnebago	17	23	3	4

WYOMING

County	Heard 1953	Heard 1954	Seen 1953	Seen 1954	Rt. No.	County	Heard 1953	Heard 1954	Seen 1953	Seen 1954
Johnson		0		7	11	Converse		45		33
Hot Springs		0		0	12	Uinta		14		14
Natrona		19		14	13	Niobrara		5		1
Carbon		0		0	14	Big Horn		10		3
Fremont		4		31	16	Campbell		7		80
Park		9		12	17	Sweetwater		15		18
Crook		0		0	18	Fremont		7		44
Carbon		1		0	19	Albany		0		1

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MOURNING DOVE NEWSLETTER

(Not for Publication)

During May and June, 1956, cooperators from 44 States conducted call counts to determine relative changes in the breeding index of mourning doves. Comparable data from 656 standardized call-count routes covered in both 1955 and 1956 are used as a basis for the determination, and are presented in this report.

Analysis of the Data

In view of the fact that knowledge of the distributional pattern of mourning doves from the breeding to the harvest areas has not progressed to the point that dove flyways can be definitely established, the call-count data in this report have been analyzed according to three different groupings of States. First, the data are combined according to seven Regions (Tables 2 and 3). Second, in view of the fact that preliminary data seem to indicate that populations east and west of the Mississippi River intermingle but little, the country has been divided on this basis (Tables 4 and 5). Since the same preliminary data seem to indicate birds banded in the Western Region are taken nowhere except in the Western Region, a third grouping has been used, composed of (1) the States east of the Mississippi; (2) the States in the North Central and South Central Regions; and (3) the States in the Western Region. (See Figure 1.)

The data were statistically analyzed, using the analysis of variance method with a paired sample approach. In the tables, if a difference is designated as being "significant", it means that the difference is significant at the 95 percent probability level but not at the 99 percent level; if the difference is listed as being "highly significant" it means that the difference is significant at the 99 percent level or above.

An innovation this year is the calculation of "weighted" averages within each Region. The weighting factors were worked out by multiplying the average number of doves heard calling per route within each State for the years 1954 and 1955 by the estimated square miles of productive dove habitat within the State. Weighting factors are necessary due to the poor distribution of sampling effort among the various States. A good example

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will be found in the Midwest Region, where Indiana is represented by only seven call-count routes (nine percent of the total routes in the Region) while data presently available indicates that about 30 percent of the total doves in the Region may find nesting places in Indiana. When the seven routes in Indiana are credited with a weight of 30 percent in determining the average for the Region, the results are somewhat different from the average based on unweighted data.

Conclusions

On the basis of doves heard calling along the 656 call-count routes, there were no significant differences between 1955 and 1956 in any of the groupings of States into which the data were divided for the purpose of analysis (Tables 2, 4, and 6). However, on the basis of doves seen while covering the routes there were significant increases in the East Central Region (+33.0 percent), and in the North Central Region (+12.5 percent). (Table 3.) When the data were grouped according to the States east and west of the Mississippi River, both areas showed significant increases over 1955, the increases being 19 percent and 16 percent respectively. (Table 5.) Finally, when the data were grouped according to the States east of the Mississippi, the States in the North and South Central Regions, and the States in the Western Region, there were significant increases among the States east of the Mississippi (+19 percent), and among the States in the North and South Central Regions (+15 percent), but although there was an increase in the number of doves seen in the Western Region, the increase was not significant (Table 7). Therefore, there seems to be little doubt but what more doves were seen along call-count routes in 1956 than in 1955 throughout the eastern two-thirds of the United States.

The reason for the lack of agreement between doves heard calling and doves seen is not immediately apparent. When the data from the several State dove research projects were summarized in the Dove Progress Report in 1952, it was concluded that doves heard calling constituted a more reliable index to changing populations than did the number of doves seen. One of the primary reasons, however, was that doves seen data were subject to greater variability, necessitating a larger sample to obtain the same degree of reliability. This, however, does not explain the lack of agreement between the two types of data this year. It is known that 1956 was a late year phenologicall throughout most of the United States as compared to 1955, which means that the nesting season could have been somewhat delayed. Since dove cooing is associated with nesting, it could be that the count this year was made prior to the peak even though it was made during a period comparable with other years.

It is concluded, therefore, that the 1956 dove breeding population is equal to that of 1955 and there is a possibility that it is somewhat larger in all Regions other than the Western. However, there is little reason to believe that the increases are large, and it must be kept in mind that this survey is designed to measure changes in breeding population. In an average year it is likely that the season's production of young makes up better than three-quarter of the birds available to the sportsmen during the fall shooting season, and there is relatively little data available at the present writing concerning current production success. It is believed that data from call-count routes do yield information regarding relative trends in dove populations which can be used as a basis for adjusting dove shooting regulations when viewed over a period of years. In this connection, 1956 constitutes the second consecutive year during which an increase has been noted in the area composed of the North Central and South Central Regions. It is the first year of an increase in the area east of the Mississippi River.

Migration

Studies of mourning dove migration from breeding grounds to areas where they are harvested have been continued, to supply a basis for interpreting population changes detected by the call-count for use in regulations. Two methods have been employed in studying migration--racial determination of doves in hunters' bags and breeding ground banding. Relative proportions of recognizable races represented in hunters' bags in concentration areas in the Southeast and in Texas, and the breeding areas they represent, are shown in Figure 2. Knowing the relative proportions of doves from certain breeding areas which supply hunting in various States, facilitates the interpretation of population data collected throughout the breeding range. Recovery of banded doves which are definitely known to represent these breeding areas will be a more exact method of appraising the situation when a sufficiently representative sample is available. A cooperative undertaking is now in progress to get nestling doves banded in sufficient quantities and over a sufficiently inclusive area to produce this information. Up to December 31, 1955, 1,221 banded nestlings had been recovered but the locations of bandings are very unevenly distributed with respect to the total breeding area. From January 1 through May 1956, the banding of 1,714 nestling mourning doves has been reported to the Banding Office. States reporting the largest numbers so far this year are: Alabama, California, Iowa, Kentucky, Minnesota, Missouri, Nebraska, and Ohio. This shows a much better distribution of current nestling banding than in the past and is a promising start on the nestling banding program.

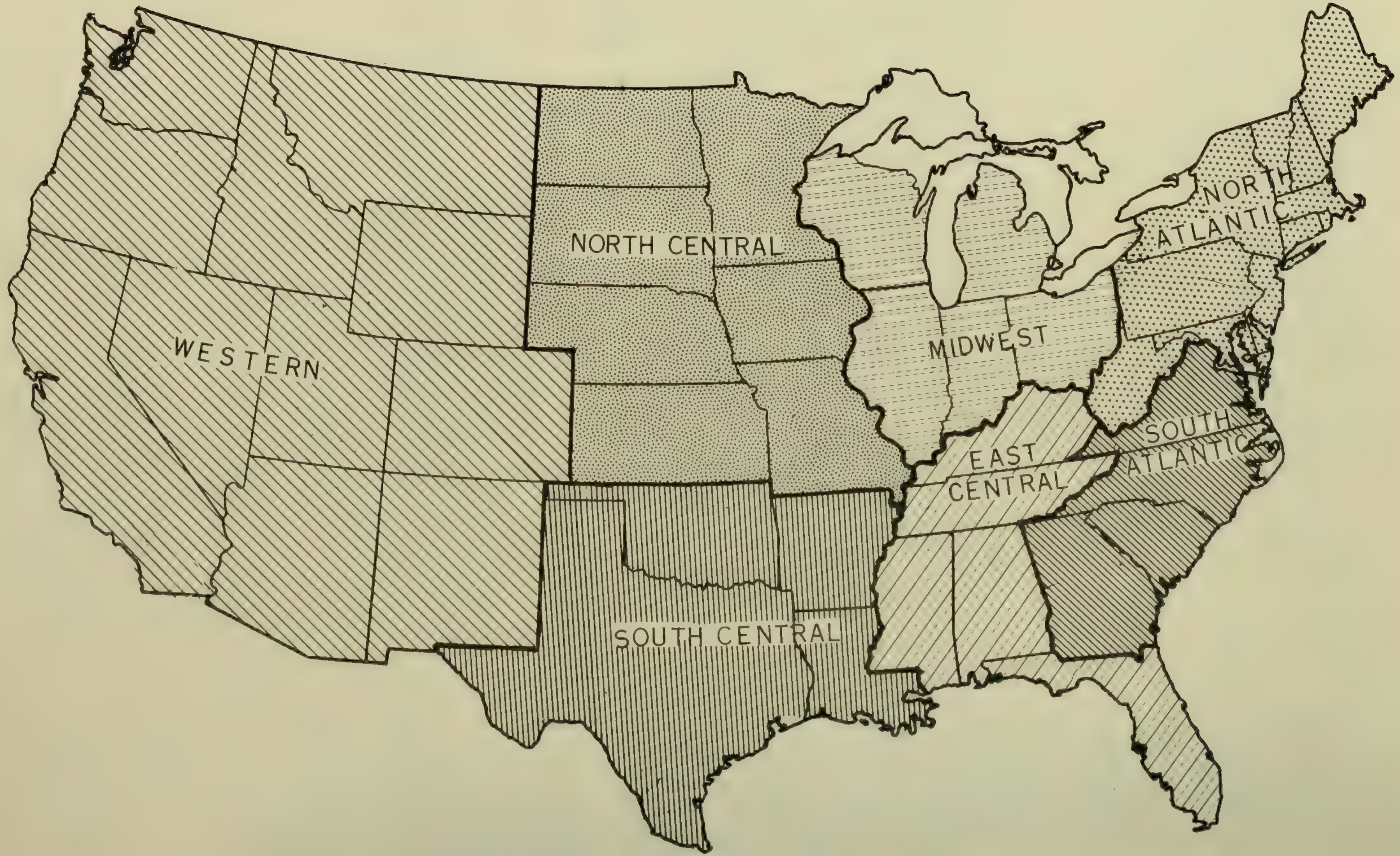
NORTH ATLANTIC
MIDWEST
NORTH CENTRAL
SOUTH ATLANTIC
EAST CENTRAL
WESTERN
SOUTH CENTRAL

Figure 1 - Regions into which Dove Call-Count Data are Combined.

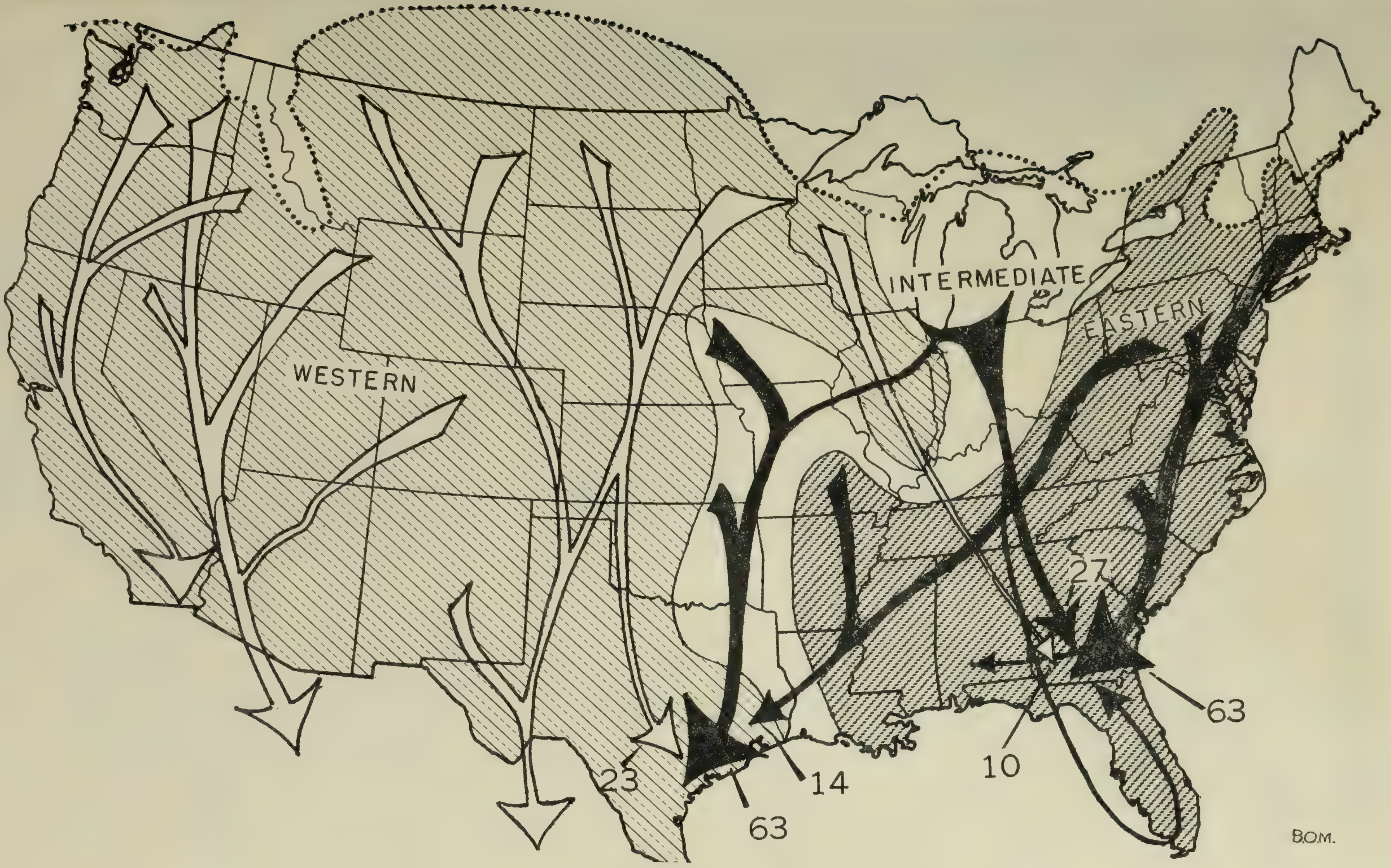
WESTERN
INTERMEDIATE
EASTERN
23
63
14
10
27
63
B.O.M.

Fig. 2 - Migration of breeding populations of mourning doves determined from races identified in hunters' bags in Texas and Georgia. Arrows indicate general direction of movement of racial populations from breeding grounds to area of harvest. Figures are percentages of each race represented at the concentration areas in the Southeast and in Texas.

TABLE I - WEIGHTING OF SAMPLES BY STATES

State	Average Doves Heard per Rt. 1954-1955	Productive Land Area of State (Sq. Mi.)	Breeding Index	Percent of Total
North Atlantic Region				
Connecticut	7.5	3,919	29,392	3
Delaware	29.5	1,978	58,351	5.5
Maryland	27.8	9,393	261,125	25
Massachusetts	4	1,977	7,908	.75
New Jersey	12.3	7,522	92,520	8.75
New York	21.3	11,982	255,216	24
Pennsylvania	9.1	23,465	213,531	20
West Virginia	8	16,863	134,904	13
		77,099	1,052,947	100
South Atlantic Region				
Virginia	19.2	39,500	758,400	20
North Carolina	24	44,232	1,061,568	28
South Carolina	32.5	30,594	994,305	26
Georgia	16.7	58,518	977,250	26
		172,844	3,791,523	100
East Central Region				
Alabama	28.1	51,078	1,435,292	26
Kentucky	22.4	40,109	898,442	16
Florida	16	54,262	868,192	16
Mississippi	23	47,420	1,090,660	20
Tennessee	29.2	41,961	1,225,261	22
		234,830	5,517,847	100
South Central Region				
Texas	46.5	263,644	12,259,446	42
Oklahoma	17	69,283	4,577,811	15
Arkansas	24	52,725	6,065,400	21
Louisiana	26.5	45,177	6,497,190	22
		430,829	29,399,847	100

Continued -

TABLE I - WEIGHTING OF SAMPLES BY STATES

(Continued)

Midwest Region

State	Average Doves Heard per Rt. 1954-1955	Productive Land Area of State (Sq. Mi.)	Breeding Index	Percent of Total
Illinois	19.5	55,947	1,090,966	21.5
Indiana	42.8	36,205	1,549,574	30.5
Wisconsin	43.1	27,358	1,179,130	23
Michigan	21.3	17,107	364,379	7
Ohio	21.8	41,122	896,460	18
		177,739	5,080,509	100
Northcentral Region				
Kansas	37.4	92,113	3,071,026	17
Iowa	37.3	55,986	2,088,277	12
Minnesota	35.4	48,006	1,699,412	10
Nebraska	36.7	76,653	2,813,165	16
South Dakota	56.2	73,475	4,129,295	23
Missouri	39	69,270	2,701,530	15
North Dakota	17	70,054	1,190,918	7
		475,557	17,693,623	100
Western Region				
Wyoming	10.2	68,254	696,190	3
Utah	40.8	65,877	2,687,781	11
New Mexico	29.8	97,209	2,896,828	12
Colorado	26.2	51,984	1,361,980	6
Arizona	36.8	102,222	3,761,770	16
Montana	31.7	102,421	3,246,745	14
Nevada	31.2	108,704	3,391,565	14
Idaho	24.5	35,607	872,372	4
Washington	34	26,791	910,894	4
Oregon	30.8	33,722	1,038,637	4
California	31	94,082	2,916,542	12
		786,873	23,781,304	100

TABLE 2 - SUMMARY OF DOVES HEARD ON CALL-COUNT ROUTES BY REGIONS, 1955 and 1956.

	REGION													
	North Atlantic		South Atlantic		Midwest		East Central		North Central		South Central		Western	
	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
Number Routes	44		59		76		98		131		88		160	
Total Birds Calling	613	775	1452	1592	1966	1973	2320	2388	5142	5375	3153	3061	5660	5864
Average Per Route (Weighted) *	15.1	20.0	23.3	25.9	29.8	28.2	23.8	24.6	47.9	45.6	34.0	33.6	35.8	36.8
Percent Change	+32.4		+11.1		- 5.4		+ 3.3		- 4.8		- 1.2		+ 2.8	
"F" Value and	3.69		3.33		.03		.32		.77		.22		.18	
Significance of Change **	Not Significant		Not Significant		Not Significant		Not Significant		Not Significant		Not Significant		Not Significant	

* See description in text and Table I for method of weighting.

** Determined by analysis of variance, using paired samples.

TABLE 3 - SUMMARY OF DOVES SEEN ALONG CALL-COUNT ROUTES BY REGIONS, 1955 and 1956.

	REGION													
	North Atlantic		South Atlantic		Midwest		East Central		North Central		South Central		Western	
	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
Number Routes	44		59		76		98		131		88		160	
Total Seen	282	295	958	1057	1375	1558	1951	2636	5077	5906	3932	4808	7953	8790
Average Per Route (Weighted)***	6.2	6.7	16.2	19.9	18.9	19.4	19.1	25.4	43.2	48.6	46.3	53.7	54.4	64.5
Percent Change		+8.1		+22.8		+2.6		+33.0		+12.5		+15.9		+18.5
"F" Value and	.04		1.01		2.32		5.06*		9.37**		3.17		1.55	
Significance of Change****	Not Significant		Not Significant		Not Significant		Significant		Highly Significant		Not Significant		Not Significant	

* Significant at the five percent level.

** Significant at the one percent level.

*** See description in text and Table I for method of weighting.

**** Determined by analysis of variance using paired samples.

TABLE 4 - SUMMARY OF DOVES HEARD ON CALL-COUNT ROUTES EAST AND WEST OF MISSISSIPPI RIVER, 1955 and 1956.

	East of River		West of River		Total U. S.	
	1955	1956	1955	1956	1955	1956
Number of Routes	277		379		656	
Total Birds Calling	6351	6728	13,955	14,300	20,306	21,028
Average Per Route (Weighted)	25.0	25.8	38.1	37.7	35.7	35.6
Percent Change		+3.2		-1.0		-0.3
"F" Value and		3.24		.36		1.38
Significance of Change	(Not Significant)		(Not Significant)		(Not Significant)	

TABLE 5 - SUMMARY OF DOVES SEEN ON CALL-COUNT ROUTES EAST AND WEST OF MISSISSIPPI RIVER, 1955 and 1956.

	East of River		West of River		Total U. S.	
	1955	1956	1955	1956	1955	1956
Number of Routes	277		379		656	
Total Seen	4566	5395	16,962	19,504	21,528	24,899
Average Per Route (Weighted)	17.4	20.8	48.6	56.4	43.0	50.0
Percent Change		+19.5		+16.0		+16.3
"F" Value and		8.12**		8.44**		13.34**
Significance of Change	(Highly Significant)		(Highly Significant)		(Highly Significant)	

* Significant of the five percent level.

** Significant of the one percent level.

TABLE 6 - SUMMARY OF DOVES HEARD ON CALL-COUNT ROUTES BY COMBINED REGIONS, 1955 and 1956.

	Region East of Mississippi R.		North and South Central Regions		Western Region	
	1955	1956	1955	1956	1955	1956
Number of Routes	277		219		160	
Total Birds Calling	6351	6728	8295	8436	5660	5864
Average Per Route (Weighted)	25.0	25.8	39.2	38.1	35.8	36.8
Percent Change		+3.2		-2.8		+2.8
"F" Value and		3.24		.18		.18
Significance of Change	(Not Significant)		(Not Significant)		(Not Significant)	

TABLE 7 - SUMMARY OF DOVES SEEN ON CALL-COUNT ROUTES BY COMBINED REGIONS, 1955 and 1956.

	Region East of Mississippi R.		North and South Central Regions		Western Region	
	1955	1956	1955	1956	1955	1956
Number of Routes	277		219		160	
Total Seen	4566	5395	9009	10,714	7953	8790
Average Per Route (Weighted)	17.4	20.8	45.1	51.8	54.4	64.5
Percent Change		+19.5		+14.8		+18.5
"F" Value and		8.12*		9.25*		1.55
Significance of Change	(Highly Significant)		(Highly Significant)		(Not Significant)	

* Significant at the one percent level.

Summary of Routes by States

ALABAMA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Houston	24	17	5	15	18	Limestone		41		51
2	Baldwin	33	21	16	24	19	Baldwin	30	29	8	21
4	Tuscaloosa	21	19	6	10	20	Mobile	12	31	9	5
5	Montgomery	24	35	12	47	21	Mobile	13	33	13	6
7	Randolph	18	20	6	14	22	Butler	12	6	9	5
12	Colbert	27	15	25	8	23	Barbour	14	17	1	8
13	Etowah	36	29	16	10	24	Marengo	12	13	1	7
15	Montgomery	47	38	11	10	25	Clarke	15	18	4	11
16	Montgomery	48	36	9	8	26	Limestone	37	39	28	4
17	Morgan		50		46	27	Jackson	51	62	44	7

ARIZONA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Graham	23	1	154	1	10	Pima	17	27	98	7
3	Santa Cruz	33	38	70	94	11	Greenlee	45	46	107	43
4	Pima	21	69	38	46	14	Yuma	31	92	59	8
5	Maricopa	70		361		16	Maricopa	56	32	44	19
6	Maricopa	53	72	469	614	17	Santa Cruz	37	23	102	15
7	Maricopa	35		257		18	Navajo		11		1
8	Maricopa	16		12		19	Yuma		64		17
9	Maricopa	22	30	147	40	22	Cochise		15		5

ARKANSAS

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Arkansas		53		70	7	Arkansas	30	27	88	1
2	Arkansas		49		77	9	Scott	14	16	9	
3	Craighead	35	32	186	77	10	Marion	36	14	24	
4	Craighead	20	55	95	124	11	Madison		30		
5	Ouachita	16	15	57	49	12	Van Buren	45	20	20	
6	Ouachita	12	12	45	42						

CALIFORNIA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Los Angeles	41		58		15	San Joaquin	11	19	93	98
2	Los Angeles	31		63		16	Sacramento		5		36
3	Sutter	12	21	53	43	17	Modoc	37	35	34	65
4	Butte-Sutter	46		53		18	Merced	18	17	18	35
5	Humboldt	0		0		19	Imperial	71	64	303	336
6	Modoc	27	29	49	47	20	Santa Cruz	34	36	7	3
7	Tehama-Shasta	40	8	16	23	21	Monterey	47	99	47	48
8	Imperial	48	63	294	591	23	Santa Clara	28	34	22	10
9	Imperial	50	61	208	219	24	Santa Clara	41	27	29	17
0	Imperial	31	29	309	91	26	San Bernardino	0	0	2	0
1	Riverside	28	53	239	399	27	San Bernardino	13	6	47	19
2	Ventura	63	60	41	16	29	Riverside	8	5	5	5
3	Los Angeles	21	85	55	13	30	Sacramento	25	35	97	66
4	Colusa	21	22	54	76	31	El Dorado	42	24	26	54

COLORADO

1	Crowley	42	59	118	88	14	Weld	4	34	8	31
2	Colejos	8	118	37	41	15	Larimer	150	189	11	26
3	Alamosa	0	123	39	25	16	Phillips	34		38	
4	Otero	56		147		17	Washington Yuma	0		0	
5	Bent	28		148							
6	Prowers	17	71	66	37	18	Yuma	0		6	
7	Adams	45	54	26	36	19	Garfield	17	50	38	58
9	Arapahoe	165	125	230	117	20	Mesa	36	59	90	87
0	Weld	121	38	80	55	21	Montrose	26	31	32	52
1	Moffat	23		6		22	Montezuma		113		62
2	Douglas	30	23	8	25	23	Boulder	16	34	23	18
3	Larimer-Weld	29	7	21	46	24	Jackson	1		1	

CONNECTICUT

1	Hartford	15	8	0	2	2	New London	13	3		0

DELAWARE

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Kent	30	33	8	6						

FLORIDA

1	Dade	16	15	9	2	13	Washington	7	22	0	9
2	Charlotte	31	29	6	1	14	Walton	2	7	0	0
3	Lee		6		5	15	Santa Rosa	40	12	8	7
4	Highlands	27	19	3	3	16	Franklin	27	15	60	36
5	Polk	20	16	13	3	17	Leon	31	10	73	26
6	Marion	15	22	0	0	18	Levy-Marion	18	14	11	21
7	Levy		14		21	19	Levy-Alachua	12	28	9	176
8	Lafayette	13	10	7	1	20	Polk	10	12	11	19
9	Volusia	15	16	0	0	21	Orange	14	12	19	26
10	Columbia	6	0	0	0	22	Alachua (1)		16		4
11	Gadsden-Leon	16	15	3	9	23	Alachua		11		0
12	Bay	0	6	0	0	24	Alachua		23		3

GEORGIA

1	Oconee	30	28	15	26	10	Laurens	8	36	18	
2	Walker	15	26	16	25	11	Bulloch	12	13	3	
3	Union		16		8	12	Randolph	16	18	12	
4	Bartow	34	46	28	23	13	Decatur	14	29	18	
5	Franklin	50	44	10	33	14	Canden	5	6	0	
6	Spalding	13	18	3	4	15	Lowndes	7	15	9	
7	Lincoln	19	34	11	9	16	Bibb-Monroe	11	14	2	
8	Taylor	6	10	13	11	17	Dodge-Pulaski	16	29	14	
9	Washington	10	16	4	14	18	Chatham-Bryan	2	8	2	

IDAHO

1	Bingham	11	9	34	35	15	Bonneville	12	8	65	
2	Power	47	53	10	29	16	Canyon	25	36	37	
3	Bannock	16	21	42	41	17	Bear Lake	2		11	

Continued -

AHO - Continued

	Heard		Seen	
County	1955	1956	1955	1956
Bannock	12	24	31	24
Power	9		113	
Nez Perce	44		33	
Nez Perce	39	26	27	38
Ada-Canyon	52	52	64	47
Ada-Canyon	30	18	40	34
Nez Perce	50	26	18	25
Nez Perce	45	40	43	31
Twin Falls	40		57	
Jefferson	12		52	

Rt.		Heard		Seen	
No.	County	1955	1956	1955	1956
18	Franklin	13		35	
19	Butte and Custer	22		16	
20	Jerome-Gooding	32		73	
21	Boise	11	9	1	1
22	Bonner-Kootenai	13	35	7	2
23	Benewah	11	19	13	4

ILLINOIS

Cooke-Lake	32	32	2	28
Lake	23	21	12	16
Williamson	39	37	21	32
Williamson	43	38	26	64
Ogle	14	25	13	22
Ogle	12	20	8	4
Hancock	18	40	22	91
Marshall-Putnam	15	10	7	7
Fulton-McDonough	9	14	43	43
Union		18		8
Macon	3	0	11	16
Ogle	4	10	3	20
Washington	38	49	46	38
Lawrence	57	49	81	53
Champaign	2	1	14	7
Whiteside	4	3	18	18
Madison	6	14	49	40

18	Madison-Jersey	35	31	36	30
19	DeKalb	0	1	6	1
20	Mason	27	31	58	55
21	Mason	25	38	44	61
22	St. Clair	12	42	41	32
23	St. Clair	15	20	19	35
24	St. Clair-Monroe		41		36
25	Lee		6		9
26	Lee		17		11
27	St. Clair		6		21
30	Winnebago		8		17
31	Winnebago		36		5
32	St. Clair-Madison		8		45
33	Tazewell		15		25
34	Knox		47		31

INDIANA

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1955	1956	1955	1956			1955	1956	1955	1956
1	Whitley	53	27	22	21	8	Lawrence-Orange		45		3
2	Whitley	36	46	10	11	9	Jackson	46	46	44	3
3	Daviess	46		87		10	Newton	14	23	7	1
4	Daviess	54		74		11	Newton	25	27	31	2
5	Hendricks	17	10	34	13	12	Wayne		25		1
6	Hendricks	48	17	48	21	13	Fulton		27		4
7	Jasper-Pulaski	19									

IOWA

1	Clay	37	11	31	38	13	Chickasaw-Bremer	69	25	17	1
2	Clay	52	22	34	47	14	Clay	21	69	39	3
3	Winnebago	19	45	14	37	15	Linn	53	44	24	3
4	Worth	17	38	13	38	16	Clarke-Decatur	79	71	71	6
5	Story	8	24	35	18	17	Kossuth	50	46	51	4
6	Boone	38	39	38	14	18	Franklin	6	8	16	1
7	Emmet	32	55	49	43	19	Wapello	67	71	32	2
8	Emmet	38	35	35	47	20	Benton	42	39	21	1
9	Polk-Dallas	58	30	126	56	21	Woodbury	51	74	38	3
10	Mills-Fremont	91	117	51	82	22	Cedar	30	26	15	2
11	Lee	32	31	95	79						
12	Bremer-Fayette	23	50	15	26						

KANSAS

1	Reno	52	74	93	97	21	Cherokee	35	45	97	1
2	Sedgwick	59	51	72	65	22	Bourbon	43	54	71	6
3	Barton	73	39	81	76	23	Atchison	67	82	62	6
4	Saline	99	77	104	95	24	Sherman	7	19	8	
5	Shawnee	68	21	60	34	25	Morton	5	10	5	
6	Montgomery	58	31	41	40	26	Greeley	2	9	7	
7	Cloud	86	45	70	80	27	Pottawatomie	49	70	70	
8	Marshall	56	102	52	56	28	Marion	65	101	92	1
9	Lyon	19	20	37	76	29	Clay	45	74	47	1
10	Crawford	31	51	34	52	30	Smith	78	55	60	

Continued -

ANSAS - Continued

t. o.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
	Barber	19	28	8	40
	Linn	57	83	44	75
	Franklin	67	60	45	29
	Russell	43	82	33	75
	Barton	70	27	65	37
	Rush	29	37	37	55
	Ness	34	16	31	29
	Finney	12	5	8	5
	Finney	49	26	104	54
	Pratt	39	27	62	52
31	Hodgeman	13	90	21	14
32	Graham	41	29	33	108
33	Ford	22	4	9	29
34	Grant	4	0	8	2
35	Rawlins	37	38	33	34
36	Gove	20	37	55	97
37	Greenwood	22	17	27	79
38	Hamilton	24	37	15	23
39	Meade	2	19	1	39

KENTUCKY

	Hickman	41	41	36	45
	Graves	39	45	66	42
	Christian	29	49	17	31
	Warren	22	19	46	19
	Larue		34		49
	Adair	11	1	28	15
	Shelby-Spencer		45		25
	Carroll-Henry-Trimble	10	21	3	12
9	Bourbon	15	20	2	4
10	Jackson	5		0	
12	Morgan	9	18	0	0
13	Lawrence	2	0	2	0
14	Calloway	38	32	30	26
15	Calloway	29	47	48	60
16	Henderson	34	33	33	39
17	Henderson	44	47	47	47
18	Trigg-Lyon	28	24	14	25
19	Trigg-Lyon	12	46	47	35

LOUISIANA

	Sabine-Vernon	36	21	14	14
	Webster-Claiborne	24	15	12	27
	Acadia	4	0	6	5
	E. Baton Rouge-Iberville	3	3	5	4
	W. Baton Rouge-Iberville	12	10	8	3
	E. Feliciana	2	13	2	1
	Tangipahoa	41	22	6	6
	Concordia	51	35	45	19
15	Lafayette	13	59	27	136
16	Lafayette	20	35	53	69
17	Morehouse	40	51	12	57
18	W. Baton Rouge	7	15	7	21
19	Terrebonne	16	5	23	6
20	Rapides	35	25	52	64
21	Rapides	63	50	32	17
24	Grant	53	37	19	36
25	Vernon	41	33	26	10
26	Lafayette-St. Martin	34	12	67	8

Continued -

LOUISIANA - Continued

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 195
10	Caldwell-Ouachita	31	17	25	3	27	Lafayette-St. Martin	35	27	85	
11	Rapides	18	33	5	10	28	Bienville	23		24	
12	Rapides	25	17	17	5	29	Point Coupee	27	26	4	
13	Vernon-Natch.	44		12		30	Union	0	12	5	2
14	Natchitoches	40	35	2	4	31	Franklin	43	49	38	2

MARYLAND

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 195
1	Howard	35	38	3	9	7	Kent	11	11	21	
2	Pr. Georges		25		9	8	Queen Anne	13	10	19	
3	Washington	1	13	0	0	9	Caroline	11	11	0	
4	Howard	12	18	7	13	10	Talbot	6	19	0	
5	Pr. Georges	45	35	26	23	11	Dorchester	16	14	3	
6	Cecil	11	11	20	18	12	Wicomico	10	19	1	

MASSACHUSETTS

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 195
1	Essex	4	2	1	0	3	Bristol	0	1	6	
2	Plymouth-Bristol	2	0	26	8						

MICHIGAN

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 195
1	Washtenaw	33	32	11	25	14	Kalamazoo	33	33	5	
2	Washtenaw	47	45	18	21	15	Kalamazoo	28		8	
4	Tuscola	2	3	1	5	18	Isabella	24	16	11	
5	Tuscola	0	26	0	7	19	Isabella	17	5	9	
6	Monroe	49	22	7	12	20	Isabella	17	8	8	
8	Monroe	40		9		21	Isabella(4)	19		9	
9	Bay	28	10	6	1	22	Isabella	12	20	10	

Continued -

ICHIGAN - Continued

t.		Heard		Seen		Rt.		Heard		Seen	
o.	County	1955	1956	1955	1956	No.	County	1955	1956	1955	1956
1	Newaygo		31		0	23	Isabella(6)	7		10	
2	Newaygo		19		8	24	Allegan	20	21	4	16
3	Ingham	7	15		5	25	Calhoun	9	24	2	3

MINNESOTA

1	Jackson	47	22	14	36	9	Beltrami	14	14	10	3
2	Jackson	30	41	30	16	10	Dakota	58	39	35	32
3	Nobles	8	23	9	24	11	Ottertail	53	43	41	33
4	Nobles	54	45	62	43	12	Dodge	60	48	16	22
5	Olmsted	32	51	15	17	13	Olmsted	12		12	
6	Olmsted	26	14	9	9	14	Lincoln	56	60	38	32
7	Scott	43	47	21	12	17	Roseau		25		0
8	Polk-Red Lake	22	34	16	6	18	Kandiyohi	39	58	32	64

MISSISSIPPI

1	Issaquena		22		38	10	Warren-Claiborne	14	8	3	4
2	Warren-Yazoo	19	27	3	37	13	Lafayette	6	13	14	21
4	Rankin	40		25		14	Washington	32	46	70	132
5	Lafayette	22	15	7	14	15	Washington	33	46	57	145
6	Stone	12	10	4	2	16	Hinds-Madison	35	20	35	52
7	Stone	11	13	0	3	17	Rankin	44	11	29	44
8	Issaquena-Warren	12	16	3	32	18	Kemper	33	63	7	22
9	Washington-Issaquena	31	35	43	35	19	Jones	9	3	1	0
						20	Choctaw	34	32	15	7

MISSOURI

1	Boone	71	44	84	112	10	Greene	14	25	71	78
2	Boone	46	66	80	104	11	St. Charles	27	34	47	43

Continued -

MISSOURI - Continued

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1955	1956	1955	1956	No.	County	1955	1956	1955	195
3	Callaway	45	59	117	187	13	DeKalb-Daviess	67	57	50	10
4	Cole	61	56	59	77	14	Daviess	57	65	85	4
5	Cape Girardeau	23	41	26	16	15	Lawrence	47	35	111	7
6	Cape Girardeau	29	39	24	43	16	Lawrence	66	46	56	5
7	Douglas-Howell	48	40	21	7	17	Marion	83	86	53	8
						18	Marion	51	73	37	8
8	Texas	36	31	6	7	19	Chariton	3	103	34	8
9	Greene	13	36	31	79	21	St. Charles	19	25	22	4

MONTANA

1	Yellowstone	22	20	2	13	17	Lincoln	8	2	0	
2	Lewis-Clark	8	8	11	25	19	Dawson	204	41		12
3	Yellowstone		72		6	20	Powder River		191		2
5	Valley		17		4	28	Pondera-Toole	5	4	2	
8	Phillips	75	50	15	16	29	Madison-Beaverhead	20	19	81	2
9	Phillips	91	83	20	31						
10	Phillips	34	51	20	7	32	Beaverhead	20		2	
11	Sheridan	2	11	8	9	35	Sweetgrass		30		1
12	Sheridan	1	12	8	7	36	Carbon	26	62	31	8
13	Sheridan	9	5	29	12	38	Musselshell	21	31	17	4
14	Madison	17	15	7	19	39	Big Horn	156	165	151	17
16	Powell	1	0	3	11	40	Wheatland	20	30	36	1

NEBRASKA

1	Lancaster	68	82	93	135	6	Lincoln		12		
2	Lancaster	100	58	75	43	9	Frontier	37	33	39	2
3	Adams	42	11	49	85	10	Red Willow	95	43	17	2
4	Adams		27		57	11	Platte	81	65	64	5
5	Hamilton	27	64	143	151						

NEVADA

t.	Heard		Seen	
o. County	1955	1956	1955	1956
Churchill	78		53	
Clark	47		233	
Clark-Mohave, Arizona	76		156	
Clark	143		47	
Clark	0		15	
Elko	21	56	8	0
Elko	35	19	21	24
Lyon	28		14	
Washoe	122	19	5	2

Rt.		Heard		Seen	
No.	County	1955	1956	1955	1956
10	Lincoln	25		31	
12	Pershing	5		79	
13	Clark	1		1	
14	Clark	14	2	73	0
15	Elko	12	31	41	11
16	Washoe	29	36	12	1
17	Lincoln	17		8	
19	White Pine	1		2	
20	Lincoln	18		32	

NEW JERSEY

Sussex	6	4	0	1
Hunterdon	13	11	5	6
Hunterdon	7	11	15	5

5	Cumberland	4		3	
7	Salem	20	22	5	0
9	Ocean	11	11	3	3

NEW MEXICO

Valencia-Bernalillo	20	22	64	94
Bernalillo-Sandoval SFE	25	46	1	19
Grant	67	74	38	50
Grant	112	82	33	109
Dona Ana	51	60	148	108
San Miquel	90		8	
San Miquel	72		8	
Chaves	15	77	29	46
Chaves	25	5	9	13
Chaves	59		7	
Taos	0	21	0	14
Rio Arriba	19	11	28	17
Rio Arriba	12	50	18	59

16	Socorro	87	29	41	9
17	Valencia-Socorro	53		181	
18	Valencia	19		34	
19	Chaves	59		17	
20	San Miquel	6	4	2	10
21	San Miquel	2	17	0	40
22	Union	3	10	2	13
23	Union	22	24	19	44
24	Roosevelt	22	29	1	10
25	Roosevelt	11	13	8	8
27	Sierra	4	2	15	3
28	Lea	305	8	109	0
29	Roosevelt	25			
31	Socorro	49	50	14	10

NEW YORK

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Niagara	28	65	9	17	7	Suffolk	47		4	
2	Niagara	28	83	8	10	8	Jefferson	22	21	0	1
3	Orleans-Genesee	18	49	15	5	9	Herkimer	0		0	
4	Wayne	54	40	17	3	10	Albany	15	12	2	4
5	Seneca	3	3	2	4	12	Tompkins	7	8		1
6	Seneca	7	5	5	5	13	Wayne	17		3	

NORTH CAROLINA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Johnston	57	35	61	50	11	Wake	9	13	28	3
2	Davidson	27	31	25	15	12	Robeson	47	49	7	2
3	Macon	12	8	5	4	13	Cabarrus	38	30	50	1
4	Wake	19	15	52	26	14	Rowan	34	43	52	6
5	Robeson	32	30	6	15	15	Currituck	9	13	1	1
6	Pitt-Martin	14	38	18	10	16	Dare	4	2	6	2
7	Martin	16	9	22	9	17	Beaufort	14	13	12	1
8	Johnston	38	35	16	20	18	Martin-Beaufort	8	17	10	3
9	Iredell	31	29	28	40						
10	Macon	4	5	1	1						

NORTH DAKOTA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Burleigh	35	35	30	26	15	Burke-Ward	10		0	
2	Burleigh	65	69	28	39	16	Williams	2	2	7	
3	McHenry-Bottineau	15	44	8	13	17	Williams	2	2	4	
4	Sheridan	8	10	18	13	18	Pembina-Ward	11	16	17	1
5	Stutsman	69	19	31	40	19	Walsh	13	21	21	2
6	Stutsman	17	11	20	11	20	Sargent	41	36	54	4
7	McHenry	3	16	3	12	21	Ward	5	5	7	
8	Renville	11	17	1	3	22	Mountrail	4	4	6	
9	Ward	10	43	4	14	23	Stark	11	31	21	1
12	Ward	20	30	7	11	24	Golden Valley	6	7	9	
13	Ward	34	31	6	12	25	Kidder	24	11	9	2
14	Burke	4	26	1	5	26	McLean	5	10	11	2

OHIO

County	Heard		Seen	
	1955	1956	1955	1956
Ottawa	23	24	16	20
Franklin	21	16	11	27
Franklin	25	6	11	12
Franklin	31		14	
Franklin	14	13	38	38
Franklin	31	9	26	9
Franklin	31	56	21	35
Franklin	24	47	13	21

Rt. No.	County	Heard		Seen	
		1955	1956	1955	1956
9	Franklin	33	13	29	35
10	Pickaway-Ross	12		14	
11	Athens	17		7	
12	Wood	18	10	7	20
13	Wood	12	8	17	3
14	Wood	24	8	13	13
15	Wood	10	8	15	11
16	Champaign	67		15	

OKLAHOMA

Oklahoma-Canadian	31	67	28	21
Tulsa-Rogers	6	34	29	29
Pittsburg-Latimer	15	20	21	17
Wagoner		37		102
Major		78		106
Johnston		20		37

7	Caddo	31	19	41	35
8	Cotton	23	18	34	48
9	McIntosh	19	45	29	19
10	Kingfisher		74		87
11	Alfalfa		98		77
12	Grady	18	18	3	7
15	Love		41		31
16	Johnston		20		37

OREGON

Umatilla	6	6	38	52
Jackson	20	24	51	100
Umatilla	64	97	30	53
Yamhill-Polk	30	19	22	33
Klamath	97	46	45	41
Deschutes	56	33	11	18
Linn	4	10	30	13
Douglas	17	96	4	4

10	Wasco	29	17	14	20
11	Morrow	68	38	124	104
12	Grant	46	42	53	46
13	Baker	6	5	17	21
14	Harney	2	11	9	10
15	Malheur	29	15	16	25
17	Hood River	7	8	5	16
18	Lake		9		38

PENNSYLVANIA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
2	Centre	2	20	1	1	10	Franklin	31	20	3	1
3	Centre	3	14	5	1	11	Lancaster	8	11	4	20
4	Centre	3		2		12	Lancaster	14		38	
5	Elk	5	1	0	0	13	York	20	16	11	13
8	Lycoming-Clinton	4	0	9	2	14	Perry	20	23	1	4
9	Allegheny-Butler	13	10	0	1	15	Perry	12	17	5	5
						16	Indiana	1		0	
						17	Indiana	3		0	

SOUTH CAROLINA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Anderson	30	37	45	68	13	Charleston	16	29	5	
2	Pickens-Oconee	35	27	54	16	14	Dorchester	14	11	0	
3	Oconee	24		36		15	Richland	59	52	27	3
4	Anderson	13	43	39	29	16	Lexington	67	74	40	3
5	Richland	26	25	5	8	17	Florence	96	100	42	5
6	Richland	22	19	1	5	18	Horry		25		
7	Laurens	33	27	11	16	19	Chesterfield	80	102	17	3
8	Aiken	49	34	6	8	20	Chesterfield	85	38	6	
9	Charleston	13	15	2	0	21	Cherokee	14		30	
10	Charleston	4	13	0	3	22	Clarendon	18	12	5	1
11	Edgefield	13	20	6	5	23	Georgetown	15	5	2	
12	Edgefield	10	15	6	1	24	Colleton		24		

SOUTH DAKOTA

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956	Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
1	Brown	35	39	42	15	7	Corson	103	90	28	
2	Brown		40		33	8	Hughes	63	71	56	
3	South Dakota	49	65	42	32	9	Kingbury	23	17	9	
4	Aurora	86	29	24	33	10	Lyman	76	50	49	

TENNESSEE

County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
Madison	14	28	15	29
Lake	28	12	45	28
Lake	46	23	28	11
Henry	27	57	23	48
Henry	31	48	54	61
Stewart	9	19	10	25
Stewart	12	19	26	34
Sumner	18	18	29	25
Sumner	12	19	11	11
Maury	18	26	24	21
Maury	17	21	23	19
Davidson-Wilson	57	33	40	9
Davidson-Wilson	31	26	16	26
Lawrence	32	29	14	5
Coffee	24	19	12	30
McMinn	35	53	38	17

Rt. No.	County	Heard 1955	Heard 1956	Seen 1955	Seen 1956
18	Bradley	21	21	21	8
19	Blount	11	12	5	7
20	Blount	26	26	8	17
21	Davidson-Cheatham	15	21	24	34
22	Davidson-Robertson	14	20	31	32
23	Shelby	28	26	36	61
24	Shelby-Tipton	8	15	9	38
25	Blount	21	26	31	21
26	Knox	31	31	26	36
27	Knox	18	18	20	18
28	Madison	34	20	24	51
29	Benton	51	46	39	50
30	Benton	53	18	52	37
31	Putnam	42	58	28	42
32	Overton	32	21	24	16

TEXAS

Wise	127	37	61	107
Wise	54	61	25	50
Robertson	52	18	70	74
Robertson	53	18	67	81
Chambers	29	25	76	43
Chambers	41	42	34	49
Bosque	82	100	62	58
Bosque	126	107		37
Wilson	119	150	58	102
Wilson	131	164	46	83
Victoria	44	15	117	79
Harris	31	29	53	40
Brazoria	70	41	105	68
Hidalgo	39	42	198	236
Chambers	34	26	24	44
Travis	25	25	25	20
Titus	57	35	59	51

35	Hemphill	11	20	22	26
36	Randall		55		47
37	Randall		31		14
38	Potter		43		142
39	Potter		33		144
40	Taylor	90		68	
41	Taylor	96		78	
42	Jefferson	44	37	44	67
43	Roberts	100	70	63	39
44	Roberts	40	45	18	29
45	Tom Green		14		71
46	Tom Green		45		91
47	Willacy	154		168	
48	Cameron		34		295
49	DeWitt	26	35	36	200
50	Bee	21	41	133	238
52	Hudspeth	9	11	3	2

Continued -

TEXAS - Continued

Rt. No.	County	Heard		Seen	
		1955	1956	1955	1956
18	Kleberg	56	38	85	439
19	Crocket	16	37	32	32
20	Crocket	21	40	42	23
21	Val Verde	21	34	140	113
22	Val Verde	46	39	46	39
23	Throckmorton		71		103
24	Throckmorton		68		89
25	Lubbock	0	0	5	8
26	Lubbock	4	3	2	10
27	Webb	11	16	56	55
28	Jefferson	18	24	28	21
29	Bexar	17	65	29	45
30	Nolan		39		218
31	Wise	54	54	61	67
32	Childress		55		153

No.	County	Heard		Seen	
		1955	1956	1955	1956
53	El Paso	0	19	57	42
54	Reeves	54	15	27	29
55	Tarrant-Midland		9		81
56	Midland-Glasscock	32	9	20	12
57	Dawson		16		129
58	Brown	40	66	102	129
59	Edwards	101	49	29	31
60	Uvalde	35		58	
62	LaSalle	40	59	75	37
63	Lamar	10	31	162	151
64	Smith	16	23	27	79
65	Hopkins	1	24	100	213
66	Nacogdoches	39	36	23	50
67	Nacogdoches	44	43	36	57
68	Uvalde	40		211	
69	Uvalde	45		203	

UTAH

Rt. No.	County	Heard		Seen	
		1955	1956	1955	1956
2	Cache	40	15	10	1
3	Tooele		68		71
4	Tooele	15	42	44	13
5	Tooele	71	21	23	22
7	Duchesne	63	123	0	4
8	San Juan	26		111	
9	Carbon Emery	12	17	10	28
11	Kane	27	25	0	1
12	Iron		20		38
14	Millard		50		20
15	Salt Lake	45	29	42	39
16	Juab	7	66	16	80
17	Juab	24		58	
18	Beaver	6		18	

No.	County	Heard		Seen	
		1955	1956	1955	1956
19	Garfield	5	12	3	18
20	Wayne-Garfield	1		0	
21	Sanpete	42	59	60	96
23	Washington	105	61	70	52
24	Rich	192	71	25	31
25	Uintah	30	12	2	0
26	Wayne-Emery	7	0	41	17
27	Weber	6			
28	Grand		4		3
29	Summit	10	4	12	32
30	Washington	17	16	127	104
31	Cache	37	53	12	53
32	Uintah	48	67	26	92

VIRGINIA

County	Heard		Seen		Rt. No.	County	Heard		Seen	
	1955	1956	1955	1956			1955	1956	1955	1956
Alexandria-Fairfax	7	4	9	25	6	Nansemond-Isle of Wight	13		37	
Fairfax	18	9	8	1	7	Campbell	21	36	11	28
Richmond-Westmoreland	27	40	33	74	8	Southampton	29		11	
Nansemond-Isle of Wight	21		39		12	Accomack	9		21	

WASHINGTON

Spokane	37	32	38	24	10	Yakima	45	35	148	109
Douglas	64	55	39	24	12	Yakima	48	31	92	81
Spokane	16	23	8	16	13	Ferry	71	22	10	15
Whitman	44	47	15	44	14	Stevens	38	36	33	18
King	2	0	0	1	15	Mason	0	0	0	0
Okanogan	51	74	104	183	16	Thurston	0	0	0	0
Skagit	4	0	11	0	18	Chelan	25	22	53	34
Yakima	71	86	132	191	19	Okanogan	51	61	242	141
Yakima	48	44	209	177	20	Okanogan	24	19	23	44

WEST VIRGINIA

Hampshire	3	19	7	0	3	Mason	12	15	4	1
Mason	6	14	3	5						

WISCONSIN

Dane-Columbia	42	49	17	22	9	Sauk	42	38	8	0
Columbia	42	44	17	19	10	Waushara	95	74	8	4
Iowa		38		3	11	Columbia	30	27	10	9
Green	36	29	23	6	12	Dane	17	27	7	15

Continued -

WISCONSIN - Continued

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1955	1956	1955	1956	No.	County	1955	1956	1955	1956
5	Jackson	74	65	4	4	13	Adams	82	66	6	10
6	Dunn	39	78	25	11	17	Winnebago	16	15	5	7
7	Dunn	37	55	14	20	18	Winnebago	23	27	7	6
8	Adams		58		7	19	Kenosha	10	17	27	11

WYOMING

1	Johnson	1	0	5	16	13	Niobrara		41		57
2	Hot Springs	6	7	148	40	14	Big Horn	17		35	
3	Natrona	24	57	36	76	15	Lincoln	40		335	
4	Carbon	5	13	2	0	16	Campbell	11		13	
5	Fremont	6	31	42	1	17	Sweet Water	15		22	
6	Park	22		61		18	Fremont		14		40
7	Platte	22		85		19	Albany	0	0	3	7
8	Washakie	38		70		20	Park	12		19	
9	Crook	4		4		21	Laramie	3		44	
10	Carbon	3	0	0	0	22	Johnson	7		5	
11	Converse-					23	Park	5		4	
	Albany	36		11		24	Lincoln	3		7	
12	Unita	12		3		25	Sublette	2		4	

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U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
WASHINGTON 25, D. C.

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MOURNING DOVE NEWSLETTER

(Not for Publication)

During May and June, 1957, cooperators from 44 States conducted the annual call-count survey of doves to determine relative changes in the breeding population index. Comparable data were obtained from 654 standardized call-count routes covered in both 1956 and 1957. An analysis of these data are presented in this report.

Basis for Summarizing Data

In past Newsletters, dove call-count survey data have been summarized according to several different types of State groupings. For example, the 1956 data were summarized in Newsletter No. 11 according to (1) seven relatively small regions; (2) a combination of the seven regions into three larger regions roughly dividing the United States into an eastern, a central, and a western unit, and (3) a further combination into two units, with the Mississippi River as the dividing line between the eastern and the western units.

During this period, general recognition was given the fact that western populations of doves were larger and could withstand somewhat more liberal regulations. However, the dividing line between what was recognized as the eastern and western groups of States did not coincide exactly with the grouping of States outlined in the preceding paragraph. Specifically, the change in regulations between east and west occurred along a line which followed the Mississippi River south to Arkansas and then shifted west to include the States of Arkansas and Louisiana with the eastern group. In view of the fact that regulations have been based on this dividing line for the past several years, plus the fact that insufficient banding data are available upon which to base final judgment as to the most appropriate management units, the data in this report have been summarized into two groups of States. The first group includes all States east of the Mississippi River plus Arkansas and Louisiana. The second group is made up of the remaining States west of the river.

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As a preliminary step in the analysis of data in the two groups of States outlined above, the data were analyzed first on the basis of individual States.

Method of Analysis

In 1956, "weighting factors" were first employed in the analysis of the call-count data. Weighting factors are necessary due to the poor distribution of sampling effort among the States; that is, a State with relatively few doves may have 30 or more routes, while a State with several times more doves may have less than 10 routes. Unless the relative importance of the States are taken into consideration in the analysis, the results can be misleading. The weighting factors which were used in analyzing the data are presented in Table 1.

The necessity for using weighting factors presents a problem, since it is not possible from a practical standpoint to statistically analyze data after they have been weighted. Further, analysis prior to weighting can be misleading. For example, on the basis of the 315 call-count routes which were run in the eastern group of States in 1956 and 1957, there was an increase of 6.2 percent in the number of doves heard calling, which proved to be significant at the 95 percent probability level. However, when the data were weighted, the amount of change was reduced to +0.3 percent. In spite of the statistical analysis which indicated a small but significant increase, it would appear that the chances are good that no increase actually occurred.

Within individual States it is possible to run a statistical check to determine the significance of change as compared to the previous year, since weighting is not involved. This was done for all States, using the analysis of variance method with a paired sample approach.

Data Collected

Tables 2 and 3 present the call-count survey data within the eastern group by individual States for 1956 and 1957 together with the amount of change between the two years and the significance of the difference.

Tables 3 and 4 present the same data as above for the western group of States. The data for doves heard and seen are presented also in Figures 1 and 2.

The data by individual call-count routes within each State for the years 1956 and 1957 are presented in the appendix.

Discussion

Within the eastern group of States there were significant increases in the number of doves heard in the States of Illinois and Tennessee. There was a significant decrease in the number heard in Louisiana. An mentioned previously, when the call-count routes for the eastern States were analyzed together, there was a small (+ 6.2 percent) but significant increase in the number of doves heard calling, but when a weighted average was calculated, the data indicated that there had been no change as compared to 1956 (+ o.3 percent).

On the basis of doves seen along call-count routes in the eastern group of States there was a significant increase in Indiana, and a significant decrease in Wisconsin. Although changes were indicated in other States, they did not prove to be significant. In the eastern States as a unit the change in doves seen along call-count routes was not significant. The weighted averages for the two years resulted in a change from 1956 to 1957 of + 5.6 percent.

Within the western group of States, there were significant increases in the number of doves heard calling in the States of Texas and Iowa. A significant decrease was recorded in Oklahoma. When the data from all States were analyzed as a unit, there was a small but statistically significant increase in the number heard (+ 9.2 percent). When weighted averages were calculated for these data the increase did not change appreciably (+ 9.6 percent). It is possible, therefore, that there was a small increase in the number of doves in the western group of States.

On the basis of doves seen along call-count routes there were significant decreases in the States of Oregon and Utah. For the entire group of western States the weighted average indicated a decrease of 6.4 percent, but the change was not statistically significant.

Conclusions

Within the eastern group of States there is reason to believe that the breeding population of doves changed very little as compared to 1956. In the western group the number of doves heard increased slightly, which is interpreted to mean that the breeding population may have increased slightly as compared to 1956. Attention is called to the fact that the call-count survey is a measure of changes in the size of the breeding population of doves. In an average fall flight there are many more young of the year than adults, which means that changes in the size of the breeding population are related to the fall flight of birds available to the hunters in only a rough way. The call-count survey does provide information concerning the general trend in population at a rather critical time of the year, but even so, it is not likely that an increase of less than 10 percent has management significance.

TABLE 1 - Factors for Weighting Samples by States.

Eastern Group of States

State	Breeding Index*	% of Total (Weighting Factor)	State	Breeding Index	% of Total (Weighting Factor)
Wisc.	1,179,130	4.21	Va.	758,400	2.71
Mich.	364,379	1.30	S. C.	994,305	3.55
Ill.	1,090,966	3.90	Ky.	898,442	3.21
Ind.	1,549,574	5.53	Ark.	6,065,400	21.66
Ohio	896,460	3.20	Tenn.	1,225,261	4.38
N. Y.	255,216	.91	N. C.	1,061,568	3.79
Penna.	213,531	.76	La.	6,497,190	23.20
Conn.	29,392	.11	Miss.	1,090,660	3.89
Del.	58,351	.21	Ala.	1,435,292	5.12
Mass.	7,908	.03	Ga.	977,250	3.49
W. Va.	134,904	.48	Fla.	868,192	3.10
Md.	261,125	.93			
N. J.	92,520	.33	TOTAL	28,005,416	100.0

Western Group of States

State	Breeding Index	% of Total (Weighting Factor)	State	Breeding Index	% of Total (Weighting Factor)
Wash.	910,894	1.56	Colo.	1,361,980	2.34
Ore.	1,038,637	1.78	Nebr.	2,813,165	4.82
Idaho	872,372	1.50	Kas.	3,071,026	5.27
Nev.	3,391,565	5.82	N. Mex.	2,896,828	4.97
Utah	2,687,781	4.61	Okla.	4,577,811	7.85
Calif.	2,916,542	5.00	Texas	12,259,446	21.03
Ariz.	3,761,770	6.45	Iowa	2,088,277	3.58
Mont.	3,246,745	5.57	Minn.	1,699,412	2.91
N. D.	1,190,918	2.04	Mo.	2,701,530	4.63
Wyo.	696,190	1.19			
S. D.	4,129,295	7.08	TOTAL	58,312,184	100.0

* The "Breeding Index" was obtained by multiplying the average number of doves heard calling per route within each State for the years 1954 and 1955 by the estimated square miles of productive dove habitat within each State.

Figure 1 -- STATUS OF MOURNING DOVE POPULATIONS AS COMPARED TO 1956 BASED ON BIRDS HEARD

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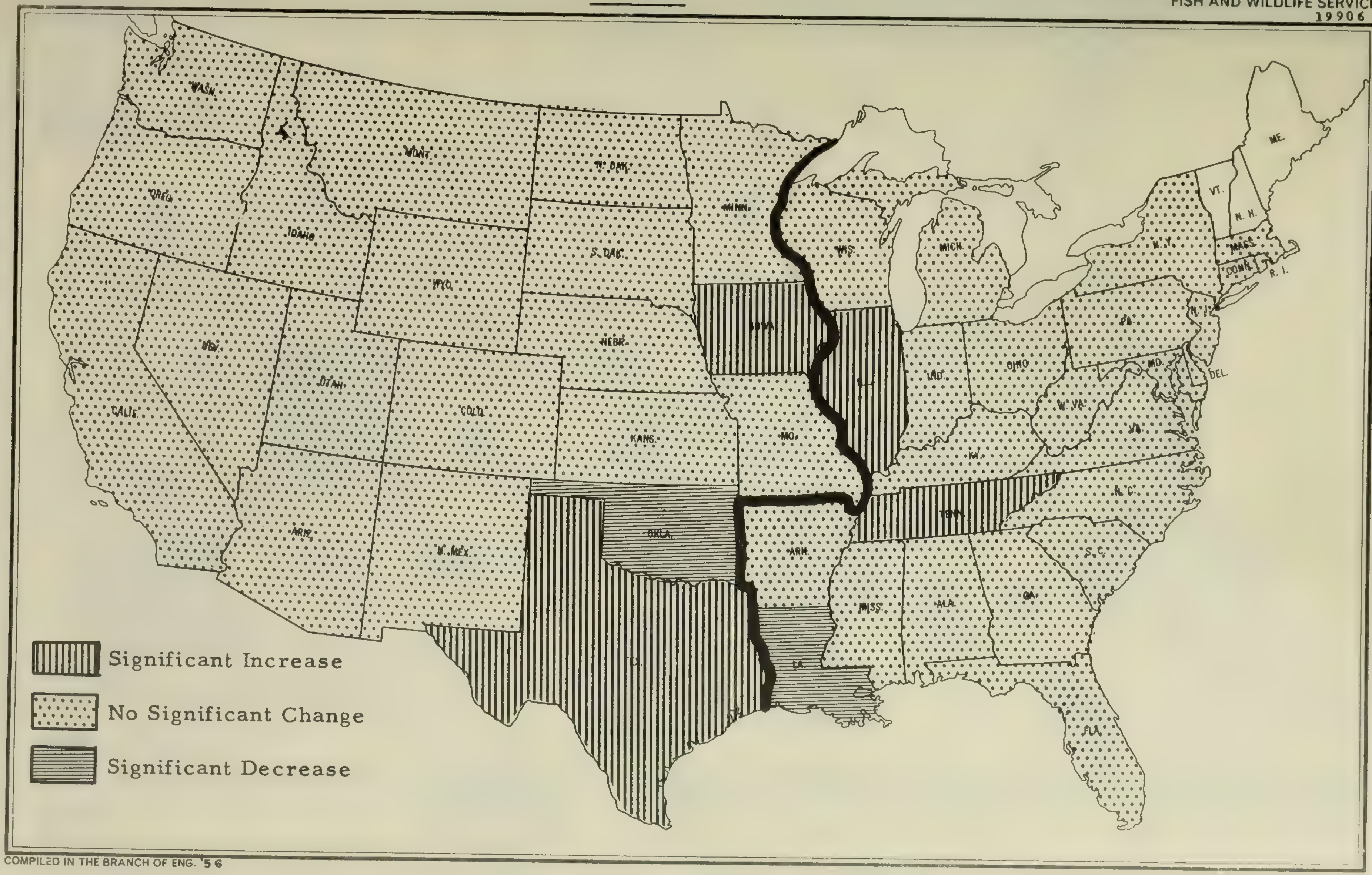
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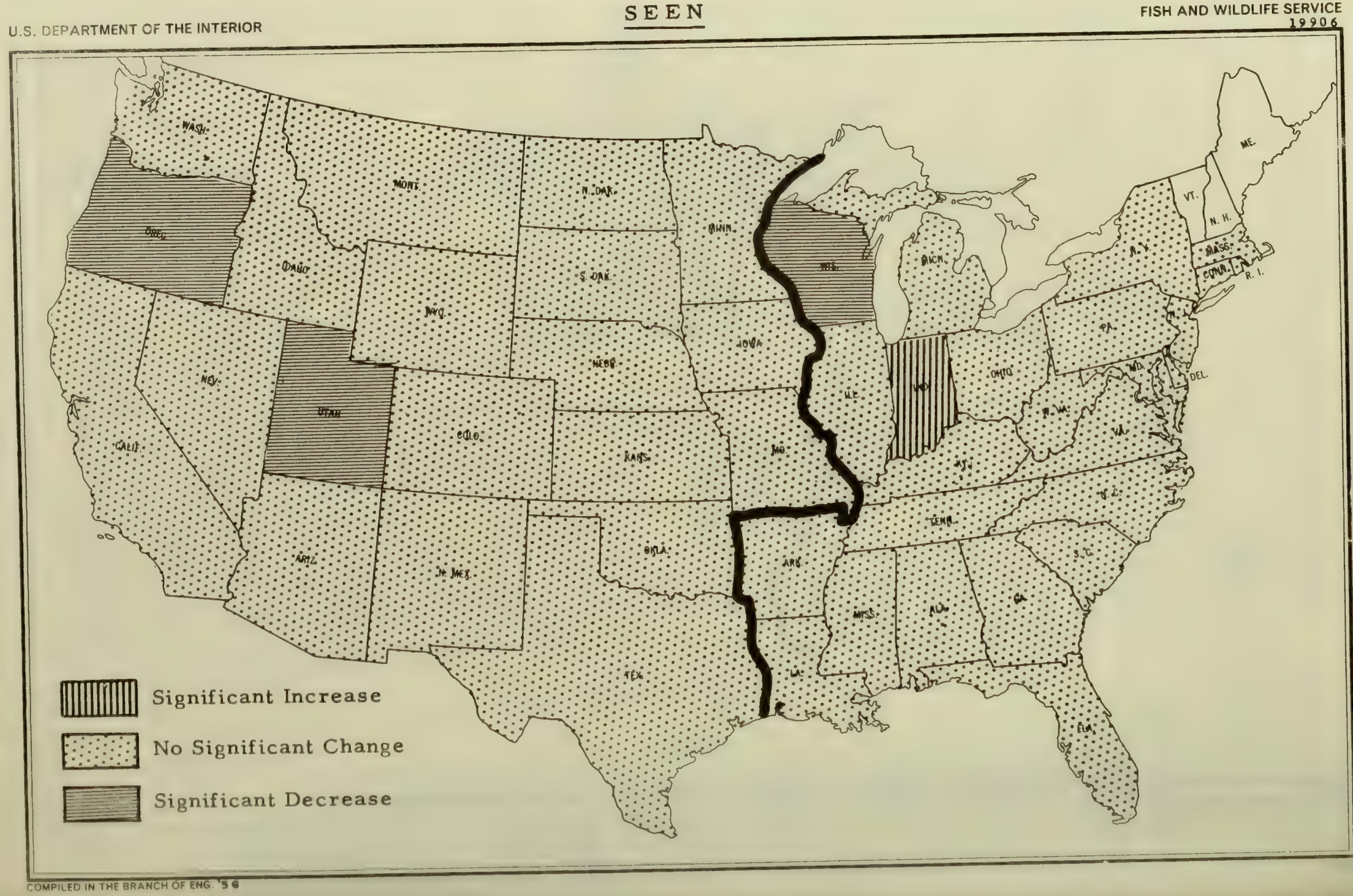
N. H.
ME.
MASS.
CONN.
R. I.
Significant Increase
No Significant Change
Significant Decrease
COMPILED IN THE BRANCH OF ENG. '56

Figure 2 -- STATUS OF MOURNING DOVE POPULATIONS AS COMPARED TO 1956 BASED ON BIRDS

SEEN


U.S. DEPARTMENT OF THE INTERIOR
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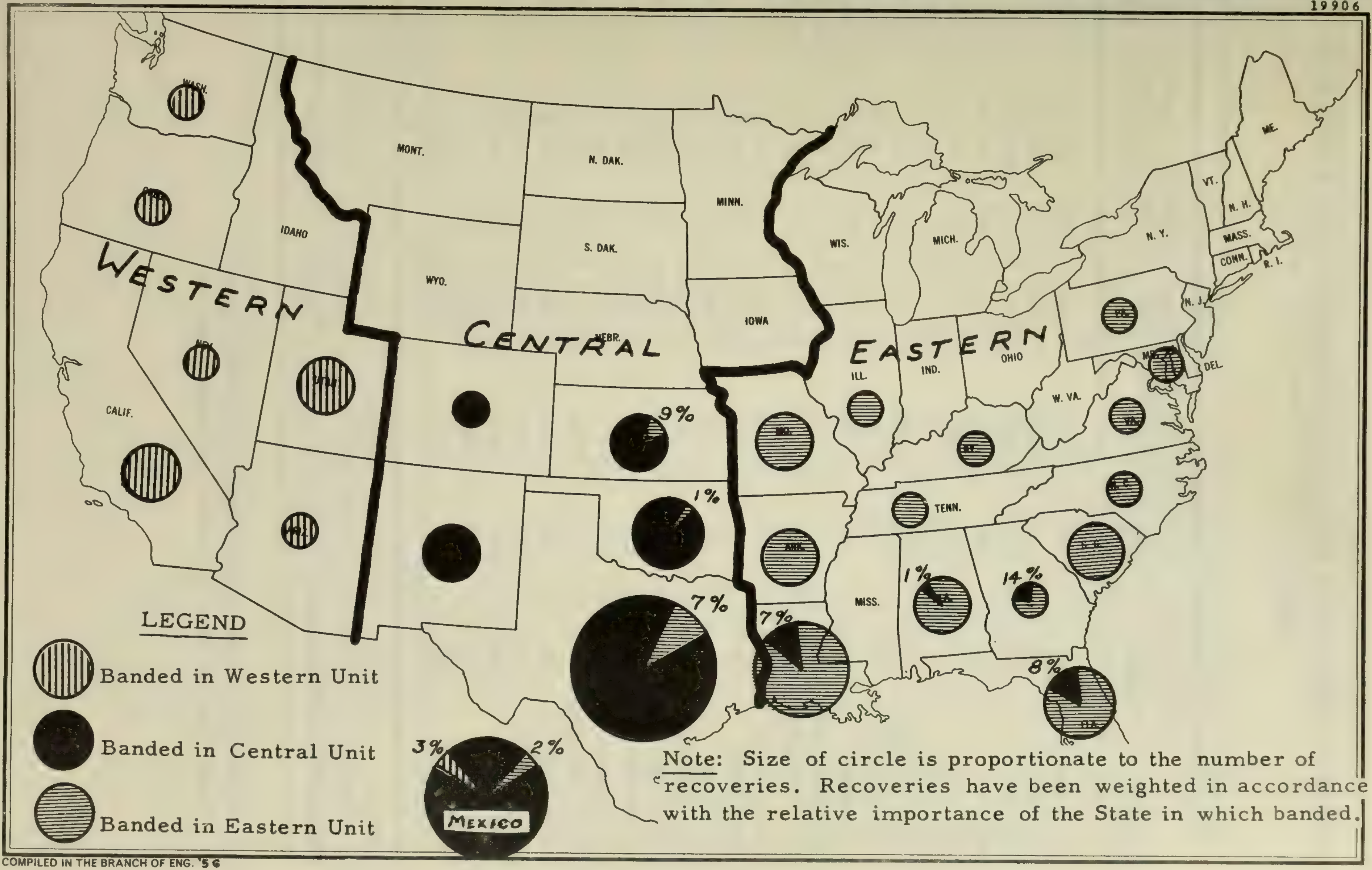
N. MEX.
COLO.
UTAH
NEV.
CALIF.
ARIZ.
Significant Increase
No Significant Change
Significant Decrease
COMPILED IN THE BRANCH OF ENG. '56

Figure 3 -- PROPOSED MOURNING DOVE MANAGEMENT UNITS BASED ON NESTLING BAND RECOVERY DATA IN STATES PERMITTING HUNTING

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE
19906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N. Y.
VT.
N. H.
MASS.
CONN.
R. I.
ME.
WESTERN
CENTRAL
EASTERN
9%
1%
7%
7%
1%
14%
8%
3%
2%
MEXICO
LEGEND
Banded in Western Unit
Banded in Central Unit
Banded in Eastern Unit

Note: Size of circle is proportionate to the number of recoveries. Recoveries have been weighted in accordance with the relative importance of the State in which banded.

COMPILED IN THE BRANCH OF ENG. '56

TABLE 2 - Summary of Doves Heard Along Call-Count Routes in the Eastern Group of States, 1956 and 1957.

State	No. of Routes	Total Heard 1956	Total Heard 1957	Average Per Route 1956	Average Per Route 1957	Percent Change
Wisconsin	16	707	606	44.2	37.9	- 14
Michigan	10	247	265	24.7	26.5	+ 7
Illinois	30	673	895	22.4	29.8	+ 33**
Indiana	11	342	383	31.1	34.8	+ 12
Ohio	12	218	242	18.2	20.2	+ 11
New York	7	275	262	39.2	37.4	- 5
Pennsylvania	11	139	158	12.6	14.4	+ 14
Connecticut	2	11	18	5.5	9.0	+ 64
Delaware	1	33	31	33.0	31.0	- 6
Massachusetts	3	3	25	1.0	8.3	++
West Virginia	3	48	23	16.0	7.7	- 52
New Jersey	5	60	71	12.0	14.2	+ 18
Maryland	12	224	214	18.7	17.8	- 4
Virginia	4	89	129	22.2	32.2	+ 45
South Carolina	22	747	757	33.9	34.4	+ 1
Kentucky	14	456	442	32.6	31.6	- 3
Arkansas	11	323	358	29.4	32.5	+ 11
Tennessee	31	829	1153	26.7	37.1	+ 39**
North Carolina	18	415	424	23.0	23.6	+ 2
Louisiana	22	547	369	24.9	16.8	- 32*
Mississippi	11	259	318	23.5	28.9	+ 2
Alabama	20	569	604	28.4	30.2	+ 6
Georgia	17	400	380	23.5	22.4	- 5
Florida	22	331	312	15.0	14.2	- 6
TOTAL	315	7945	8439	25.2	26.8	+ 6.2*
WEIGHTED AVERAGE	-			26.81	26.89	+ 0.3

* Significant at the 95 percent probability level.
** Significant at the 99 percent probability level.

TABLE 3 - Summary of Doves Seen Along Call-Count Routes in the Eastern Group of States, 1956 and 1957.

State	No. of Routes	Total Heard 1956	Total Heard 1957	Average Per Route 1956	Average Per Route 1957	Percent Change
Wisconsin	16	154	99	9.6	6.2	- 36*
Michigan	10	109	137	10.9	13.7	+ 26
Illinois	30	845	901	28.2	30.0	+ 7
Indiana	11	331	572	30.1	52.0	+ 73*
Ohio	12	244	228	20.3	19.0	- 6
New York	7	45	65	6.4	9.3	+ 44
Pennsylvania	11	49	59	4.4	5.4	+ 20
Connecticut	2	2	0	1.0	0	--
Delaware	1	6	12	6.0	12.0	+100
Massachusetts	3	27	9	9.0	3.0	- 67
West Virginia	3	6	12	2.0	4.0	+100
New Jersey	5	15	57	3.0	11.4	++
Maryland	12	88	103	7.3	8.6	+ 17
Virginia	4	128	135	32.0	33.7	+ 5
South Carolina	22	355	378	16.1	17.2	+ 6
Kentucky	14	437	526	31.2	37.6	+ 20
Arkansas	11	606	744	55.1	67.6	+ 23
Tennessee	31	867	1033	28.0	33.3	+ 19
North Carolina	18	381	446	21.2	24.8	+ 17
Louisiana	22	520	270	23.6	12.3	- 48
Mississippi	11	554	463	50.4	42.1	- 17
Alabama	20	426	479	21.3	23.9	+ 12
Georgia	17	211	216	12.4	12.7	+ 2
Florida	22	369	303	16.8	13.8	- 18
TOTAL	315	6775	7247	21.5	23.0	+ 7.0
WEIGHTED AVERAGE -				30.05	31.74	+ 5.6

* Significant at the 95 percent level of probability.

TABLE 4 - Summary of Doves Heard Along Call-Count Routes in the Western Group of States, 1956 and 1957.

State	No. of Routes	Total Heard		Average Per Route		Percent Change
		1956	1957	1956	1957	
Washington	18	587	872	32.6	48.4	+ 48
Oregon	13	413	469	31.7	36.0	+ 14
Idaho	12	302	304	25.1	25.3	+ 1
Nevada	16	393	405	24.6	25.3	+ 3
Utah	14	437	501	31.2	35.8	+ 15
California	26	788	829	30.3	31.9	+ 5
Arizona	12	490	405	40.8	33.7	- 17
Montana	14	552	486	39.4	34.7	- 12
North Dakota	20	414	474	20.7	23.7	+ 14
Wyoming	7	122	208	17.4	29.7	+ 70
South Dakota	8	401	595	50.1	74.3	+ 52
Colorado	14	960	784	68.6	56.0	- 18
Nebraska	8	383	469	47.8	58.6	+ 22
Kansas	35	1561	1543	44.6	44.0	- 1
New Mexico	13	503	364	38.7	28.0	- 28
Oklahoma	10	372	293	37.2	29.3	- 21*
Texas	45	1874	2315	41.6	54.4	+ 24*
Iowa	21	944	1234	45.0	58.7	+ 31**
Minnesota	14	521	459	37.2	32.8	- 12
Missouri	19	961	1159	50.6	61.0	+ 21
TOTAL	339	12,977	14,168	38.3	41.8	+ 9.2*
WEIGHTED AVERAGE -				39.72	43.53	+ 9.6

* Significant at the 95 percent level of probability.

** Significant at the 99 percent level of probability.

TABLE 5 - Summary of Doves Seen Along Call-Count Routes in the Western Group of States, 1956 and 1957.

State	No. of Routes	Total Seen		Average Per Route		Percent Change
		1956	1957	1956	1957	
Washington	18	1102	809	61.2	44.9	- 26
Oregon	13	454	276	34.9	21.2	- 39*
Idaho	12	317	265	26.4	22.1	- 16
Nevada	16	266	300	16.6	18.8	+ 13
Utah	14	511	297	36.5	21.2	- 42*
California	26	2412	3083	92.8	118.6	+ 28
Arizona	12	1933	1165	161.1	97.1	- 40
Montana	14	175	213	12.5	15.2	+ 22
North Dakota	20	319	295	16.0	14.8	- 8
Wyoming	7	180	365	25.7	52.1	+103
South Dakota	8	286	260	35.8	32.5	- 9
Colorado	14	705	733	50.4	52.4	+ 4
Nebraska	8	575	611	71.9	76.4	+ 6
Kansas	35	1985	1639	56.7	46.8	- 18
New Mexico	13	536	478	41.2	36.8	- 11
Oklahoma	10	424	437	42.4	43.7	+ 3
Texas	45	3969	4142	88.2	92.0	+ 4
Iowa	21	797	885	38.0	42.1	+ 11
Minnesota	14	316	219	22.6	15.6	- 31
Missouri	19	1335	1149	70.3	60.5	- 14
TOTAL	339	18,597	17,621	54.8	52.0	- 5.2
WEIGHTED AVERAGE -				60.34	56.49	- 6.4

* Significant at the 95 percent level of probability.

Proposed Dove Management Areas

Experience during the past several years has indicated strongly that the dove population within the United States is not composed of one heterogeneous unit, but that it is made up of several sub-units, each with its own breeding and harvest areas. Since there are indications that population densities and ability to withstand harvest by hunters is not similar between the sub-units, management of the dove resource can be more efficient if these sub-units can be delineated.

In setting up management units, the nature of the problem must be understood. At the present time, dove regulations are based largely on an annual measurement of dove population levels made on the breeding areas during May and June. The basic problem is one of associating these changes in breeding population with probable changes in the availability of birds to the hunters the following fall. An ideal management units, therefore, would be one in which an individual harvest area is associated with a breeding unit which supplies few if any birds to other harvest areas, and which is an ecological entity insofar as possible.

By reason of the nature of the problem it is possible to use only the recoveries of nestling bandings to determine the existance of, and geogrphical boundaries, of management units. You will recall that the annual population survey is a measurement of breeding birds which are definitely associated with a given area. By the same token, nestlings are associated with definite areas also. On the other hand, once a young dove begins to fly it beings to wander. By late summer a sizable number of northern birds have moved as far as southern Florida and southern Texas. The place in which flying young are banded, therefore, is not indicative of the location in which the birds were raised. This appears to be true also for any adult not in condition to feed young. For this reason it is not appropriate to use the recoveries of young birds banded as flyers, or of most adults, for the purpose of determining management units.

When this fact was recognized, a determined effort was made to increase the amount of nestling banding. The nestling banding program got underway in 1952. During 1953, 6,120 nestlings were banded. The program gradually gained momentum until in 1956, cooperators in 44 States banded a total of 30,911 young doves before they had left the nest. To date, 1,051 recoveries have been received from the nestlings banded during the period 1952 through 1956. For the first time, enough data of the right type are available to make a preliminary analysis. It is emphasized, however, that the analysis is preliminary, since of the 1,051 recoveries, only 872 were taken in the 28 States in which hunting has been permitted during the last few years. It is of interest to note that 75 bands were returned from Mexico, 3 from Guatemala, 1 from Honduras, 1 from Salvador, and the remainder from the States in which hunting was not permitted.

Method of Analyzing Banding Data

Unfortunately, the banded sample of nestlings has not been distributed in a representative manner throughout the United States. In Table 1, a series of weighting factors are presented which indicate the relative importance of each State in dove production. Ideally, the number of recoveries from bandings within a given State should be the same portion of the total recoveries as the breeding index is of the total index. Some States have banded far more than their share, while other States have fallen short. For example, although Texas is the most important dove producing State, its breeding index is only 14.2 percent of the National total. Texas banders, however, have been active to the extent that their recoveries amount to 34.8 percent of the total. As a preliminary step in the analysis, therefore, the recoveries from all States were weighted in accordance with the relative importance of the State involved as indicated by the breeding index. Again using Texas as an example, all recoveries of birds banded in the State were multiplied by .41 (14.2/34.8). The weighted recovery data are presented in Table 6 and are presented graphically in Figure 3.

Discussion

The grouping of States into the management units illustrated in Figure 3 differs in several respects from any groupings that have been used in previous Newsletters. In the past, the Mississippi River has been used as a dividing line between groupings in all cases. In Figure 1 it will be noted that the States of Missouri, Arkansas, and Louisiana are grouped with States east of the river. The decision to place these three States with the eastern group was based on the recovery data which indicated that in each case a greater portion of the recoveries from birds banded outside the State originated in States of the eastern group than in the central. In Louisiana, for example, 6.4 bands (weighted) were recovered from birds banded in the central management unit, while 23.0 came from States in the eastern unit (other than recoveries from bandings within Louisiana). If Arkansas and Missouri are considered to be in the central unit, the picture does not change appreciably. These data made it appear that Louisiana was much more dependent on birds produced east of the Mississippi River than west of the river for its shooting, and prompted our decision to include the State with the eastern unit. The same thing was ture for Arkansas and Missouri.

Another change occurred in what heretofore has been considered as a "western" region. Band recoveries in the States of Colorado and New Mexico, from birds banded in the States of Minnesota, North Dakota, and Texas, indicate a connection with production areas further east. The central management unit was, therefore, extended westward to include the States of Montana, Wyoming, Colorado, and New Mexico. With this grouping of States, the dividing line between the central and western management units is in the vicinity of the Continental Divide, and from an ecological standpoint this line would appear to have several advantages.

It may be that as additional recoveries of nestling bandings become available that the pattern may change somewhat. No nestling banding has been done in some States and very little in others. Before a final decision can be reached as to the most appropriate geographical units for managing mourning doves, nestling band recoveries will be needed from all areas. Also, there is some evidence that the distribution of recoveries from some banding locations is not uniform from one year to the next. For example, the nestling recoveries from bandings in Missouri in 1956 were about evenly split between States east and west of the Mississippi River, while during the previous four years, the preponderance of the recoveries were from east of the river. The important consideration is that recoveries over a period of five years or more will be required from many areas close to potential dividing lines between one management area and another before an average expectancy in distribution can be determined.

Those who cooperated in the 1956 nestling banding program are to be congratulated for a job well done. At the same time, however, they should be encouraged to continue their efforts in 1957 and for another three or four years. At the same time, a determined effort should be made to fill in the gaps where little banding has been done.

Table 6 - Recoveries in States Permitting Hunting of Nestling Mourning Doves Banded from 1952-1956* - Part I

Banded In	Ark.	Ariz.	Ark.	Calif.	Colo.	Fla.	Ga.	Ill.	Kas.	Ky.	La.	Md.	Miss.	Mo.	Nev.	N. Mex.
Ala.	13.8					.9	.9				1.8					
Ark.	10.5		21.0			10.5					10.5			10.5		
Calif.				33.7												
Fla.						10.5										
Ill.	.9		.3			2.3		6.1		.3	1.4		.6			
Ind.	1.4					5.4	2.7	1.4								
Iowa						3.1					1.0					
Kansas									14.9							
Ky.	.6					.7	.2			8.2	.4			.1		
La.						4.5					67.8					
Md.												1.6				
Mass.	.1					.4	.1					.1				
Mich.	.6					1.9					.6			.6		
Minn.											3.4					3.4
Miss.						2.8	.6				.8		7.6			
Mo.	1.6					1.1	.5		.5	1.1	.5			20.7		
Mont.																
Nebr.									1.6		1.6					
N. Mex.																23.9
N. C.																
N. D.					.5	.5	.5		.5							
Ohio	1.4					3.2	.4				1.4					
Okla.																
Ore.																
Penna.							.2				.2					
S. C.																
S. D.																
Tenn.											2.1			1.1		
Texas	.4					.4	.4				.4					1.2
Utah		11.1														
Va.																
Wash.				1.7												
Wisc.	1.1					2.2		1.1	1.1		3.3		2.2		.8	
Wyo.																
TOTAL	32.4	11.1	21.3	35.4	.5	50.4	6.5	8.6	18.6	9.6	97.2	1.7	10.4	33.0	.8	28.5

*Recoveries weighted so as to bring no. of recoveries from bandings within a State into agreement with the relative importance of the State in dove production as determined by the dove breeding index (See Newsletter #11, 6/25/56).

Continued --

Table 6 - Continued.

Banded In	N. C.	Okla.	Ore.	Penna.	S. C.	Tenn.	Texas	Utah	V a.	Wash.	Mex.	TOTAL
Ala.												17.4
Ark.							10.5					73.5
Calif.											1.5	35.2
Fla.												10.5
Ill.							1.2					13.1
Ind.							1.4					12.3
Iowa		1.0					6.1				6.1	17.3
Kansas		7.5					7.5				7.5	37.4
Ky.	.1				.1	.2	.1					10.7
La.							6.8					79.1
Md.					1.6							3.2
Mass.	.2			.1	.1		.1					1.2
Mich.							.6					4.3
Minn.							6.9					13.7
Miss.							1.7					13.5
M o.		.5			.5	.5	3.2				2.1	32.8
Mont.											37.6	37.6
Nebr.							12.5				14.0	29.7
N. Mex.											12.0	35.9
N. C.	13.2											13.2
N. D.							5.3				5.8	13.1
Ohio					.4		.4		.4			7.6
Okla.		27.9					27.9					55.8
Ore.			6.3							6.3		12.6
Penna.	.2			1.9								2.5
S. C.					11.5							11.5
S. D.							30.1				16.7	46.8
Tenn.						11.8						15.0
Texas		.4					136.1				10.7	150.0
Utah								22.2				33.3
V a.					8.8							8.8
Wash.										6.0	2.6	11.1
Wisc.	1.1											12.1
Wyo.											8.1	8.1
TOTAL	14.8	37.3	6.3	2.0	23.0	12.5	258.4	22.2	.4	12.3	124.7	879.9

Summary of Routes by States

ALABAMA

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1956	1957	1956	1957	No.	County	1956	1957	1956	1957
1	Houston	17	16	15	29	18	Limestone	41	30	51	36
2	Baldwin	21	25	24	27	19	Baldwin	29	38	21	14
4	Tuscaloosa	19	27	10	16	20	Mobile	31	34	5	13
5	Montgomery	35	36	47	52	21	Mobile	33	36	6	19
7	Randolph	20	9	14	7	22	Butler	6	15	5	6
12	Colbert	15	25	8	10	23	Barbour	17	17	8	7
13	Etowah	29	29	10	25	24	Marengo	13	33	7	13
15	Montgomery	38	23	10	7	25	Clarke	18	26	11	13
16	Montgomery	36	20	8	3	26	Limestone	39	50	42	44
17	Morgan	50	34	46	29	27	Jackson	62	81	78	121

ARIZONA

1	Graham	1	67	1	230	14	Yuma	92	61	82	65
3	Santa Cruz	38	29	94	12	16	Maricopa	32	47	195	51
4	Pima	69	14	46	24	17	Santa Cruz	23	21	155	77
6	Maricopa	72	41	614	403	18	Navajo	11	14	16	11
10	Pima	27	30	72	30	19	Yuma	64	42	176	156
11	Greenlee	46	33	430	97	21	Cochise	15	6	52	9

ARKANSAS

1	Arkansas	53	68	70	57	7	Arkansas	27	27	132	25
2	Arkansas	49	54	77	56	9	Scott	16	9	5	8
3	Craighead	32	38	77	245	10	Marion	14	13	7	3
4	Craighead	55	57	124	228	11	Madison	30	32	11	13
5	Ouachita	15	18	49	47	12	Van Buren	20	23	12	12
6	Ouachita	12	19	42	50						

Continued --

CALIFORNIA

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1956	1957	1956	1957	No.	County	1956	1957	1956	1957
3	Sutter	21	30	43	56	17	Modoc	35	62	65	67
4	Butte	27	41	115	160	18	Merced	17	6	35	10
5	Humboldt	11	4	6	4	19	Imperial	64	148+	336	876+
6	Modoc	29	18	47	11	20	Santa Cruz	36	16	3	5
7	Tehama-Shasta	8	9	23	49	21	Monterey	99	42	48	23
8	Imperial	63	58+	591	867+	23	Alameda-Santa Clara	34	41	10	14
9	Imperial	61	43	219	193	24	Santa Clara	27	29	17	2
10	Imperial	29	42	91	139	27	San Bernardino	6	2	19	14
11	Riverside	53	61	399	399	28	Imperial	12	15	19	13
12	Ventura	60	47	26	38	29	Riverside	5	22	5	10
13	Los Angeles	85	63	13	12	30	Sacramento	35	16	66	48
14	Colusa	22	20	76	32	31	El Dorado	24	25	54	26
15	San Joaquin	19	4	98	28	32	Kern	71	73	65	37
16	Sacramento	5	7	36	10						

COLORADO

1	Crowley	59	37	88	40	13	Larimer-Weld	7	37	46	35
3	Alamosa	123	22	25	20	14	Weld	34	12	31	8
6	Prowers	71	6	37	59	15	Larimer	189	122	26	20
7	Adams	54	69	36	70	20	Mesa	59	51	87	64
9	Arapahoe	125	158	117	124	21	Montrose	31	18	52	34
10	Weld	38	65	55	65	22	Montezuma	113	133	62	136
12	Douglas	23	21	25	23	23	Boulder	34	33	18	35

CONNECTICUT

1	Hartford	8	12	2	0	2	New London	3	6	0	0

DELAWARE

1	Kent	33	31	6	12

FLORIDA

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1956	1957	1956	1957	No.	County	1956	1957	1956	1957
1	Dade	15	15	2	3	14	Walton	7	18	0	41
2	Charlotte	29	25	1	2	15	Santa Rosa	12	21	7	31
3	Lee	6	3	5	0	16	Franklin	15	20	36	49
5	Polk	16	11	3	2	17	Leon	10	21	26	48
6	Marion	22	13	0	1	18	Levy-Marion	14	15	21	13
7	Levy	14	14	21	12	19	Levy-Alachua	28	22	176	10
8	Lafayette	10	13	1	2	20	Polk	12	16	19	9
9	Volusia	16	10	0	0	21	Orange	12	17	26	26
11	Gadsden-Leon	15	14	9	7	22	Alachua	16	12	4	7
12	Bay	6	3	0	0	23	Alachua	11	6	0	4
13	Washington	22	18	9	12	24	Alachua	23	5	3	24

GEORGIA

1	Oconee	28	55	26	32	10	Laurens	36	16	10	11
2	Walker	26	37	25	34	11	Bulloch	13	21	8	11
3	Union	16	35	8	15	12	Randolph	18	22	13	14
4	Bartow	46	35	23	21	13	Decatur	29	23	3	6
5	Franklin	44	37	33	10	15	Lowndes	15	23	5	9
6	Spalding	18	15	4	5	16	Bibb-Monroe	14	11	3	5
7	Lincoln	34	8	9	7	17	Dodge-Pulaski	29	15	13	14
8	Taylor	10	8	11	14	18	Chatham-Bryan	8	6	3	0
9	Washington	16	13	14	8						

IDAHO

1	Bingham	9	22	35	23	14	Jefferson	18	16	72	55
4	Bannoch	24	39	24	21	15	Bonneville	20	15	93	78
7	NezPerce	26	34	38	41	16	Canyon	36	22	44	18
8	Ada-Canyon	52	24	47	19	21	Boise	9	7	1	1
9	Ada-Canyon	18	22	34	20	22	Bonner-Kootenai	35	27	2	0
10	Nez Perce	26	26	25	17						
11	Nez Perce	40	43	31	27	23	Benewah	19	23	4	0
						24	Gem-Payette	97	92	161	165

ILLINOIS

Rt.		Heard		Seen	
No.	County	1956	1957	1956	1957
1	Cooke-Lake	32	26	28	8
2	Lake	21	23	16	11
3	Williamson	37	64	32	27
4	Williamson-Jackson	38	62	64	42
5	Ogle	25	29	22	19
6	Ogle	20	27	4	11
7	Hancock	40	37	91	60
8	Marshall-Putnam	10	8	7	8
9	Fulton-McDonough	14	23	43	41
10	Union	18	33	8	17
11	Macon	0	6	16	3
12	Ogle	10	11	20	9
13	Washington	49	71	38	53
14	Lawrence	49	61	53	108
15	Champaign	1	4	7	16
16	Whiteside	3	5	18	21
17	Madison	14	21	40	41
18	Madison-Jersey	31	21	30	18
19	DeKalb	1	5	1	4
20	Mason	31	49	55	40
21	Mason	38	62	61	40
22	St. Clair	42	27	32	54
23	St. Clair	20	26	35	26
24	St. Clair-Monroe	41	32	36	35
25	Lee	6	7	9	5
26	Lee	17	20	11	8
27	St. Clair	6	50	21	126
30	Winnebago	8	10	17	8
31	Winnebago	36	35	5	27
33	Tazewell	15	40	25	15

INDIANA

1	Whitley	27	48	21	26
2	Whitley	46	25	11	3
4	Daviess	49	41	91	165
5	Hendricks	10	16	13	50
6	Hendricks	17	17	21	56
8	Lawrence-Orange	45	39	39	118
9	Jackson	46	33	36	49
10	Newton	23	18	17	9
11	Newton	27	66	21	25
12	Wayne	25	39	16	37
13	Fulton	27	41	45	34

IOWA

1	Clay	11	1	38	25
2	Clay (North)	22	2	47	18
3	Winnebago	45	46	37	51
4	Worth	38	41	38	76
5	Story	24	18	18	39
6	Boone	39	63	14	32
7	Emmet	55	63	43	42
8	Emmet	35	59	47	29
9	Polk-Dallas	30	61	56	49
10	Mills-Fremont	117	196	82	64
12	Bremer-Fayette	50	67	26	17

Continued --

IOWA - Continued --

Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957	Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957
13	Chickasaw-Bremer	25	57	18	9	17	Kossuth	46	71	43	16
14	Clay	69	67	30	35	18	Franklin	8	10	18	47
15	Linn	44	47	33	12	19	Wapello	71	89	26	42
16	Clarke-Decatur	71	97	60	144	20	Benton	39	42	13	45
						21	Woodbury	74	92	31	38

KANSAS

Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957	Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957
1	Reno	74	69	97	82	21	Cherokee	45	44	109	77
2	Sedgwick	51	96	65	88	22	Bourbon	54	44	65	52
3	Barton	39	29	76	31	23	Atchison	82	64	61	125
4	Saline	77	72	95	184	24	Sherman	19	3	16	0
5	Shawnee	21	71	34	34	25	Morton	10	7	15	5
6	Montgomery	31	21	40	71	26	Greeley	9	10	10	2
7	Cloud	45	86	80	112	27	Pottawatomie	70	50	74	62
8	Marshall	102	101	56	67	28	Marion	101	47	191	75
9	Lyons	20	59	76	37	29	Clay	74	53	101	48
10	Crawford	51	66	52	56	30	Smith	55	61	72	63
11	Barber	28	33	40	19	31	Hodgeman	90	52	14	12
12	Linn	83	44	75	33	32	Graham	29	19	108	57
13	Franklin	60	43	29	55	33	Ford	4	3	29	14
14	Russell	82	60	75	49	34	Grant	0	3	2	7
16	Rush	37	27	55	18	35	Rawlins	38	48	34	47
17	Ness	16	49	29	17	36	Gove	37	39	97	66
18	Finney	5	4	5	5	37	Greenwood	17	15	79	30
19	Finney	26	22	54	43	38	Hamilton	37	28	23	12
20	Pratt	27	87	52	39	39	Meade	19	20	39	15

KENTUCKY

Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957	Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957
1	Hickman	41	32	45	33	12	Morgan	18	12	0	0
2	Graves	45	27	42	37	14	Calloway	32	44	26	34
3	Christian	49	36	31	66	15	Calloway	47	37	60	68
4	Warren	19	36	19	22	16	Henderson	33	34	39	44
5	Larue	34	27	49	47	17	Henderson	47	60	47	60
6	Adair	1	7	15	14	18	Trigg-Lyon	24	34	25	26
9	Bourbon	20	25	4	9	19	Trigg-Lyon	46	31	35	66

LOUISIANA

Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957	Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957
1	Sabine-Vernon	21	5	14	15	17	Morehouse	51	36	57	25
3	Acadia	0	7	5	1	18	W. Baton Rouge	15	7	21	23
5	E. Baton Rouge-Iberville	3	3	4	9	19	Terrebonne	5	0	6	1
6	W. Baton Rouge-Iberville	10	3	3	1	20	Rapides	25	28	64	36
8	Tangipahoa	22	4	6	4	21	Rapides	50	47	17	22
9	Concordia	35	30	19	7	24	Grant	37	31	36	10
10	Caldwell-Ouachita	17	22	3	16	25	Vernon	33	12	10	15
12	Rapides	17	12	5	6	26	Lafayette-St. M.	12	21	8	12
13	Vernon-Natch.	25	25	5	8	27	Lafayette - St. M.	27	29	3	19
14	Natchitoches	35	18	4	13	29	Pointe-Coupee	26	36	4	5
15	Lafayette	59	4	136	5	30	Union	12	13	26	20
16	Vermilion	35	1	69	5						

MARYLAND

1	Howard	38	32	9	8	7	Kent	11	9	6	4
2	Prince George	25	24	9	7	8	Queen Anne	10	16	5	12
3	Washington	13	13	0	14	9	Caroline	11	17	0	1
4	Howard	18	24	13	24	10	Talbot	19	17	0	0
5	Prince George	35	28	23	7	11	Dorchester	14	14	4	8
6	Cecil	11	10	18	16	12	Wicomico	19	10	1	2

MASSACHUSETTS

1	Essex	2	12	0	1	3	Bristol	1	11	19	8
2	Plymouth-Bristol	0	2	8	0						

MICHIGAN

1	Washtenaw	32	22	25	20	5	Tuscola	26	7	7	6
2	Washtenaw	45	37	21	27	6	Monroe	22	36	12	29
4	Tuscola	3	26	5	10	11	Newaygo	31	24	0	1

Continued --

MICHIGAN - Continued --

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
12	Newaygo	19	13	8	3	14	Kalamazoo	33	34	10	6
13	Ingham	15	18	5	9	24	Allegan	21	48	16	26

MINNESOTA

1	Jackson	22	22	36	12	8	Polk-Red L.	34	27	6	12
2	Jackson	41	32	16	32	9	Beltrami	14	10	3	4
3	Nobles	23	9	24	16	10	Dakota	39	47	32	18
4	Nobles	45	56	43	31	12	Dodge	48	49	22	14
5	Olmstead	51	39	17	15	14	Lincoln	60	11	32	11
6	Olmstead	14	34	9	15	17	Roseau	25	34	0	3
7	Scott	47	27	12	12	18	Kandiyohi	58	62	64	24

MISSISSIPPI

1	Issaquena	22	23	38	41	10	Warren-Claiborne	8	14	4	8
2	Warren-Yazoo	27	48	37	65	13	Lafayette	13	35	21	15
5	Lafayette	15	27	14	19	14	Washington	46	38	132	73
6	Stone	10	15	2	7	15	Washington	46	36	145	41
7	Stone	13	6	3	1	16	Hinds-Madison	20	14	52	30
8	Issaquena-Warren	16	19	32	31	17	Rankin	11	17	44	40
9	Washington-Issaquena	35	47	35	100	18	Kemper	63	48	22	16
						19	Jones	3	3	0	0

MISSOURI

1	Boone	44	102	112	66	6	Cape Girardeau	39	44	43	49
2	Boone-Callaway	66	70	104	80	7	Howell-Douglas	40	42	7	6
3	Callaway	59	84	187	101	8	Texas	31	37	7	8
4	Cole	56	42	77	20	9	Green	36	45	79	39
5	Cape Girardeau	41	25	16	33	10	Green	25	30	78	46

Continued --

MISSOURI - Continued --

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
11	St. Charles	34	31	43	65	16	Lawrence	46	66	51	203
13	De Kalb-Daviess	57	159	108	104	17	Marion	86	67	82	47
						18	Marion	73	56	89	63
14	Daviess-Caldwell	65	121	46	69	19	Chariton	103	57	86	44
						21	St. Charles	25	28	49	37
15	Lawrence	35	53	71	69						

MONTANA

1	Yellowstone	20	21	13	21	11	Sheridan	11	2	9	0
2	Lewis-Clark	8	23	25	6	12	Sheridan	12	10	7	1
3	Yellowstone	72	21	6	2	13	Sheridan-Roosevelt	5	11	12	18
5	Valley	17	22	4	50						
8	Phillips	50	107	16	71	14	Madison	15	12	19	12
9	Phillips	83	133	31	13	16	Powell	0	0	11	0
10	Phillips	51	27	7	6	17	Lincoln	2	7	1	0
						20	Powder River	191	76	22	21

NEBRASKA

1	Lancaster	82	114	135	83	5	Hamilton	64	70	151	136
2	Lancaster	58	67	43	55	9	Frontier	33	13	28	73
3	Adams	11	43	85	72	10	Red Willow	43	37	20	31
4	Adams	27	39	57	63	11	Platte	65	86	56	98

NEVADA

1	Churchill	8	71	16	75	10	Lincoln	22	2	48	8
3	Clark-Mohave	50	23	32	18	12	Pershing	8	18	108	23
4	Clark	108	15	11	30	13	Clark	1	0	0	0
5	Clark	0	2	0	3	14	Clark	2	8	0	2
						15	Elko	31	26	11	1
6	Elko-White Pine	56	59	0	1	16	Washoe	36	28	1	0
7	Elko	19	14	24	24	17	Lincoln	0	4	2	10
8	Lyon	7	38	5	7	20	Lincoln	26	20	6	80
9	Washoe	19	77	2	18						

NEW JERSEY

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Sussex	5	9	1	9	7	Salem	22	27	0	0
3	Hunterdon	11	15	6	23	9	Ocean	11	5	3	3
4	Hunterdon	11	15	5	22						

NEW MEXICO

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Bernalillo-					10	Chaves	77	23	46	62
	Valencia	22	12	94	40	11	Chaves	5	13	13	7
2	Bernalillo-					13	Taos	21	8	14	2
	Sandoval-					14	Rio Arriba	11	22	17	8
	Santa Fe	46	32	19	5	16	Socorro	29	33	9	8
3	Grant	74	55	50	31	23	Union	24	13	44	14
4	Grant	82	45	109	35	27	Sierra	2	3	3	11
5	Dona Ana	60	62	108	212	31	Socorro	50	43	10	43

NEW YORK

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Niagara	65	72	17	20	4	Wayne	40	18	3	13
2	Niagara	83	75	10	11	6	Seneca	5	7	5	4
3	Orleans-					8	Jefferson	21	24	1	2
	Genessee	49	45	5	13	10	Albany	12	21	4	2

NORTH CAROLINA

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Johnston	35	58	50	61	10	Macon	5	7	1	21
2	Davidson	31	26	15	29	11	Wake	13	11	38	27
3	Macon	8	5	4	1	12	Robeson	49	30	23	23
4	Wake	15	16	26	23	13	Cabarrus	30	28	19	40
5	Robeson	30	29	15	3	14	Rowan	43	37	61	61
6	Pitt-Martin	38	27	10	17	15	Currituck	13	7	1	0
7	Martin	9	33	9	15	16	Dare	2	3	2	3
8	Johnston	35	44	20	33	17	Beaufort	13	20	11	21
9	Iredell	29	29	40	49	18	Martin-				
							Beaufort	17	14	36	19

NORTH DAKOTA

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
2	Burleigh	69	80	39	23	17	Williams	2	9	8	7
3	McHenry-Bottineau	44	54	13	22	18	Walsh-Pembina	16	26	14	23
4	Sheridan	10	9	13	7	19	Walsh	21	34	27	30
5	Stutsman	19	16	40	31	20	Sargent	36	82	47	18
6	Stutsman	11	5	11	13	21	Ward	5	19	0	14
8	Ward-Renville	17	14	3	6	22	Mountrail	4	10	3	17
9	Ward	43	33	14	2	23	Starke	31	20	17	10
12	Ward	30	0	11	14	24	Golden Valley	7	11	2	13
14	Burke	26	6	5	4	25	Kidder	11	16	24	17
16	Williams	2	9	5	8	26	McLean	10	21	23	16

OHIO

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Ottawa	24	26	20	12	8	Franklin	47	27	21	17
2	Franklin	16	11	27	23	9	Franklin	13	20	35	6
3	Franklin	6	10	12	24	12	Wood	10	24	20	16
5	Franklin	13	14	38	22	13	Wood	8	29	3	9
6	Franklin	9	8	9	42	14	Wood	8	18	13	9
7	Franklin	56	35	35	39	15	Wood	8	20	11	9

OKLAHOMA

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Oklahoma-Canadian	67	39	21	28	6	Comanche	38	40	29	9
						7	Caddo	19	12	35	22
2	Tulsa-Rogers	34	13	29	37	8	Cotton	18	23	48	102
						9	McIntosh	45	19	19	16
3	Pittsburg-Latimer	20	14	17	16	10	Kingfisher	74	64	87	109
						12	Grady	18	25	7	5
4	Wagoner	37	24	102	57	16	Johnston	20	45	37	41

OREGON

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957			1956	1957	1956	1957
1	Umatilla	6	16	52	22	3	Umatilla	97	101	53	48
2	Jackson	24	20	100	23	4	Yamhill-Polk	19	19	33	14

Continued --

OREGON - Continued --

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1956	1957	1956	1957	No.	County	1956	1957	1956	1957
5	Klamath	46	57	41	13	13	Baker	5	7	21	24
6	Deschutes	33	48	18	11	14	Harney	11	13	10	17
8	Linn	10	14	13	15	15	Malheur	15	18	25	22
9	Douglas	96	66	4	6	17	Hood River	8	18	16	13
10	Wasco	17	27	20	12	18	Lake	9	40	38	33
12	Grant	42	50	46	28						

PENNSYLVANIA

2	Centre	20	3	1	2	9	Allegheny-Butler	10	12	1	0
3	Centre	14	7	1	5	10	Franklin	20	44	1	0
5	Elk	1	1	0	0	11	Lancaster	11	29	20	24
6	Elk-Jefferson	7	2	1	1	13	York	16	22	13	17
8	Lycoming-Clinton	0	2	2	1	14	Perry	23	21	4	5
						15	Perry	17	15	5	4

SOUTH CAROLINA

1	Anderson	37	44	68	47	13	Charleston	29	14	1	8
2	Pickens-Oconee	27	26	16	29	14	Dorchester	11	9	3	1
4	Anderson	43	20	29	8	15	Richmond	52	38	33	89
5	Richland	25	15	8	6	16	Lexington	74	81	38	73
6	Richland	19	10	5	7	17	Florence	100	103	57	25
7	Laurens	27	23	16	3	18	Horry	25	11	5	5
8	Aiken	34	24	8	7	19	Chesterfield	102	68	34	22
9	Charleston	15	12	0	5	20	Chesterfield	38	67	7	4
10	Charleston	13	4	3	4	22	Clarendon	12	30	12	6
11	Edgefield	20	15	5	3	23	Georgetown	5	11	1	3
12	Edgefield	15	12	1	1	24	Colleton	24	120	5	22

SOUTH DAKOTA

1	Brown	39	59	15	42	3	Hanson-Davison	65	76	32	21
2	Brown	40	43	33	30						

Continued --

SOUTH DAKOTA - Continued --

Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957
4	Aurora	29	152	33	26
7	Corson	90	52	29	34
8	Hughes	71	93	49	22
9	Kingsbury	17	35	26	32
10	Lyman	50	85	69	53

TENNESSEE

Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957
1	Madison	28	23	29	24
3	Lake	12	26	28	30
4	Lake	23	41	11	21
5	Henry	57	57	48	65
6	Henry	48	68	61	59
7	Stewart	19	25	25	30
8	Stewart	19	31	34	38
9	Sumner	18	20	25	44
10	Sumner	19	27	11	26
11	Maury	26	31	21	81
12	Maury	21	19	19	40
13	Davidson - Wilson	33	66	9	29
14	Davidson-Wilson	26	56	26	33
15	Lawrence	29	29	5	25
16	Coffee	19	26	30	17
17	McMinn	53	46	17	21
18	Bradley	21	26	8	23
19	Blount	12	26	7	17
20	Blount	26	31	17	22
21	Davidson-Cheatham	21	26	34	35
22	Davison-Robertson	20	28	32	38
23	Shelby	26	54	61	25
24	Shelby-Tipton	15	13	38	18
25	Blount	26	14	21	23
26	Knox	31	26	36	34
27	Knox	18	29	18	25
28	Madison	20	53	51	39
29	Benton	46	77	50	67
30	Benton	18	58	37	25
31	Putnam	58	55	42	35
32	Overton	21	46	16	24

TEXAS

Rt. No.	County	Heard		Seen	
		1956	1957	1956	1957
3	Robertson	18	29	74	47
4	Robertson	18	46	81	45
5	Chambers-Jefferson	25	35	43	79
6	Chambers	42	40	49	36
7	Bosque	100	49	58	119
8	Bosque	107	64	37	30
9	Wilson	150	167	102	87
10	Wilson	164	206	83	133
11	Victoria	15	9	79	170
13	Brazoria	41	35	68	191
14	Hidalgo	42	41	236	251
16	Travis	25	31	20	22
17	Titus	35	27	51	78
18	Kleberg	38	116	439	180
19	Crockett	37	34	32	99
20	Crockett	40	31	23	78
21	Val Verde	34	92	113	103

Continued --

TEXAS - Continued --

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1956	1957	1956	1957	No.	County	1956	1957	1956	1957
22	Val Verde	39	52	39	53	48	Cameron	34	36	295	297
23	Throckmorton	71	185	103	141	49	Dewitt	35	45	200	44
24	Throckmorton	68	95	89	144	50	Bee	41	40	238	279
25	Lubbock	0	0	8	4	52	Hudspeth	11	17	2	10
26	Lubbock	3	3	10	7	53	El Paso	19	23	42	51
27	Webb	16	16	55	43	54	Reeves	15	25	29	7
28	Jefferson	24	56	21	33	55	Tarrant	9	10	81	50
30	Nolan	39	29	218	77	56	Midland-Glasscock	9	31	12	322
32	Childress	55	29	153	90						
35	Hemphill	20	8	26	26	57	Dawson	16	103	129	309
42	Jefferson	37	36	67	89	58	Brown	66	75	129	179
43	Roberts	70	40	39	35	59	Edwards	49	69	31	73
44	Roberts	45	35	29	25	64	Smith	23	37	79	14
45	Tom Green	14	63	71	171	66	Nacogdoches	36	28	50	24
46	Tom Green	45	78	91	89	67	Nacogdoches	43	30	57	34

UTAH

2	Cache	15	28	1	0	21	Sanpete	59	98	96	59
3	Tooele	68	37	71	19	23	Washington	61	75	52	35
4	Tooele	42	14	13	38	25	Uintah	12	82	0	4
5	Juab-Tooele	21	15	22	4	28	Grand	4	1	3	0
11	Kane	25	25	1	4	30	Juab	16	11	104	9
12	Iron	20	18	38	49	31	Summit	53	55	53	12
15	Salt Lake	29	38	39	44						
19	Garfield-Kane	12	3	18	20						

VIRGINIA

1	Alexandria-Fairfax	4	10	25	27	3	Richmond-Westmoreland	40	50	74	62
2	Fairfax	9	36	1	23	7	Campbell	36	33	28	23

WASHINGTON

Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957	Rt. No.	County	Heard 1956	Heard 1957	Seen 1956	Seen 1957
1	Spokane	32	51	24	9	10	Yakima	35	22	109	44
2	Douglas	55	75	24	20	12	Yakima	31	20	81	53
3	Spokane	23	27	16	6	13	Ferry	22	133	15	9
4	Whitman	47	120	44	38	14	Stevens	36	149	18	7
5	King	0	1	1	0	17	Douglas	37	53	129	99
6	Okanogan	74	41	183	90	18	Chelan	22	26	34	86
8	Yakima	86	75	191	165	19	Okanogan	61	63	141	92
9	Yakima	44	41	177	122	20	Okanogan	19	28	44	68

WEST VIRGINIA

1	Hampshire	19	9	0	3	3	Mason	15	9	1	2
2	Mason	14	5	5	7						

WISCONSIN

1	Dane-Columbia	49	36	22	13	9	Sauk	38	48	0	4
2	Columbia	44	35	19	6	10	Waushara	74	74	4	10
3	Iowa	38	36	3	3	11	Columbia	27	31	9	6
4	Green	29	31	6	4	12	Dane	27	28	15	2
5	Jackson	65	43	4	1	13	Adams	66	57	10	10
6	Dunn	78	40	11	13	17	Winnebago	15	23	7	0
7	Dunn	55	25	20	8	18	Winnebago	27	20	6	6
8	Adams	58	35	7	3	19	Kenosha	17	44	11	10

WYOMING

1	Johnson	0	48	16	18	5	Fremont	31	40	1	56
2	Hot Springs	7	21	40	116	10	Carbon	0	3	0	0
3	Natrona	57	44	76	9	18	Fremont	14	43	40	162
4	Carbon	13	12	0	1	19	Albany	0	0	7	3

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Bureau of Sport Fisheries and Wildlife
Washington 25, D. C.

Issue No. 13

June 30, 1958

MOURNING DOVE NEWSLETTER
(Not for Publication)

Each year during the last week in June decisions must be reached regarding mourning dove shooting regulations for the coming season. As a preliminary step in establishing appropriate regulations it is necessary to bring together all pertinent information regarding the current status of dove populations. The data are published in the form of a Dove Newsletter. The current issue includes the following:

1. A summary and analysis of the 1957 and 1958 call-count survey conducted in 44 States.
2. A revision of the "weighting factors" used in analyzing call-count survey and banding data.
3. A revised table of first-year recoveries of nestling bandings which includes an additional 348 recoveries from the 1957-58 hunting season.
4. An estimate of mourning dove kill for the hunting seasons of 1955-56 and 1956-57 for 22 of the 30 States where hunting was allowed.

Call-Count Survey

Each year during May and June, cooperators from 44 States conduct a survey to determine trends in the breeding population of mourning doves. Comparable data were obtained from 652 survey routes which were covered in both 1957 and 1958.

The population data have been summarized on the basis of an eastern and a western group of States with the dividing line between the groups following the Mississippi River south to Arkansas and then

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shifting west to include the States of Arkansas and Louisiana with the eastern group. In Mourning Dove Newsletter No. 12, dated July 5, 1957, appeared a proposal for subdividing the United States into three management units. However, as yet there are insufficient banding data available upon which to base final decisions in all instances with regard to the location of the line dividing the management units. Therefore, for at least the 1958 season, the same eastern and western groups of States will be used as have been used for the past several years for setting seasons.

The call-count data were analyzed by the same statistical procedure as was used in 1957. That is, within each State the data were checked to determine the significance of change as compared to the previous year. Weighted averages were then calculated for the two management units. Since a statistical determination of significance of change of weighted data is not feasible, the likelihood of change in doves heard and seen as compared with 1957 was estimated subjectively.

Data Collected:

Tables 1 and 2 present the call-count survey data within the eastern group by individual States for 1957 and 1958, together with the amount of change between the two years and the significance of the difference.

Tables 3 and 4 present the same data as above for the western group of States.

The data by individual call-count routes within each State for the years 1957 and 1958 are presented in the Appendix.

Discussion:

Within the eastern group of States there were no significant changes in the number of doves heard in any individual State. The weighted average of doves heard within the eastern group increased 1.8 percent as compared to 1957, which, for all practical purposes, can be considered as no change.

On the basis of doves seen along call-count routes in the eastern group of States there was a significant decrease in the State of Florida (- 63 percent). Within the eastern group of States, the weighted average indicated a decrease of 3.9 percent, which can be considered as indicating no change in population.

Within the western group of States, there were no significant changes in the number of doves heard calling in any individual State. When the data from all States were analyzed as a unit there was a small but statistically significant decrease in the number of birds heard (- 8.1 percent). When weighted averages were calculated for these data, the decrease was greater (- 10.3) percent). It seems evident therefore that there was a small but definite decrease in the number of doves in the western group of States.

On the basis of doves seen along call-count routes in the western States, the weighted average indicated a decrease of 4.3 percent, which can be considered as indicative of no change.

Conclusions:

Within the eastern group of States it is evident that the breeding population of doves has changed very little as compared to 1957. In the western States there has been a small decrease in the breeding population as compared to last year. Attention is called to the fact that the call-count survey is a measure of changes in the size of the breeding population of doves. In an average fall flight there are many more young of the year than adults, which means that changes in the size of the breeding population are related to the fall flight of birds available to the hunters in only a rough way. The call-count survey does provide information concerning the general trend in population at a rather critical time of the year, but even so, it is not likely that a change of 10 percent has management significance.

Weighting Factors

The sampling intensity in the call-count survey as it is presently conducted is not distributed among the States in a manner which allows for a straight-forward analysis of the data. For example, some States with a relatively small dove population are represented by a large number of call-count routes, while othere States with large populations have few routes. For this reason it is necessary to give weight to the data from each State in relation to the relative size of its dove population when summarizing the data from several States.

Also, the number of nestling doves banded in each of the various States has not been in relation to the relative size of the dove population among the States. These discrepancies must be brought into line by weighting before the banding data can be properly analyzed.

Weighting factors were first employed in 1956. The factors used in 1956 and 1957 were based on an estimated dove index for each State. These indices were based on the multiplication of two factors. These factors are (1) average dove density as determined by all dove call-count survey routes run in 1954 and 1955, and (2) an estimate of the number of square miles of dove habitat in each State.

The weighting factors have been re-calculated this year. Call-count data from 1956 and 1957 have been added to those from the previous two years in order to arrive at a more reliable density average. Also, experience has shown that the original estimate of extent of dove habitat in some States was in error and was in need of revision.

The revised weighting factors are presented in Table 5.

Summary of Nestling Band Recoveries

On pages 15 and 16 of Newsletter No. 12 appeared a table summarizing first-year recoveries of nestling mourning dove bandings for the period 1952 through 1956. This table has been altered to include an additional 348 recoveries which were obtained during the 1956-57 season. Also, the total recoveries for the period were adjusted by means of the new weighting factors presented in Table 5.

As mentioned earlier in this report, the additional 348 recoveries are still insufficient as a basis for a final decision regarding the placement of the dividing lines between the proposed management units as outlined in Newsletter No. 12 (pages 12 and 13). About all that can be said at the present time is that the additional recoveries tend to substantiate the three proposed management units and do not refute them in any respect.

Estimate of Dove Kill

Following the hunting seasons of 1955-56 and 1956-57 a questionnaire was circulated among the 30 States where dove hunting was allowed asking for an estimate of kill. Eighteen of the 30 States supplied an estimate for both years, and four additional States estimated their kill for one of the two years. The estimates given and the source of the information are presented in Table 7.

When sufficient recoveries are available, weighted banding data can also be used as a means of determining the relative distribution of kill among States. Although relatively few recoveries are available for some States, nevertheless sufficient numbers have been obtained to demonstrate the soundness of the technique. For example, 11 of the States reporting an estimate of kill obtained their information by means of a mail questionnaire. Methods for conducting kill surveys by mail questionnaires are reasonably standardized, and it seems likely that the kill data from these States are resonably comparable. For 8 of the 11 States a reasonable number of band recoveries are available. The percent distribution of kill among the 8 States as determined by mail questionnaire and weighted band recovery data is presented in Table 8.

As can be seen, the relationship between the percent distribution of kill as determined by the two methods is quite close. The correlation coefficient for the two series of data is .976, which is highly significant, statistically.

On the basis of the data from the eight States involved, it is possible to project the kill estimates by means of the weighted band recoveries to include the remaining States where data were not collected by means of a mail-questionnaire. The regression equation expressing the relationship between weighted band recoveries and kill as measured by mail-questionnaire in the eight States is as follows: $E = 29{,}613\ X + 122{,}300$. The weighted band recoveries in the States not employing a mail-questionnaire method for estimating kill totaled 744.7. For this number of band recoveries, the expected kill in these States would be 22,175,100 (substituting 744.7 for X in the above regression equation). When the estimate of 7,877,000 doves killed in the eight-state sample is added to the calculated figure, the national kill of doves becomes 30,052,100.

The 30 million kill figure is an estimate of what the total would likely have been if all States had carried out a comparable kill survey by the mail-questionnaire method. Experience with similar methods in estimating kill of waterfowl has revealed the presence of considerable exaggeration bias in kill data so obtained. Although methods have been developed for removing exaggeration bias from waterfowl kill data, the same is not true for doves. Undoubtedly the 30 million kill estimate contains a rather large bias. Experience with waterfowl kill data indicate the possibility that the estimate of 30 million may be double the actual kill figure. Much additional research work is needed before data of this type can be used to obtain an estimate of the actual kill of doves in the United States.

TABLE 1 - Summary of Doves Heard Along Call-Count Routes in the Eastern Group of States, 1957 and 1958

State	No. of Routes	Total Heard		Average Per Route		Percent Change
		1957	1958	1957	1958	
Alabama	27	571	645	21.1	23.9	+ 13.0
Arkansas	12	363	375	30.2	31.2	+ 3.3
Connecticut	2	18	14	9.0	7.0	- 22.2
Delaware	1	31	30	31.0	30.0	- 3.2
Florida	22	312	248	14.2	11.3	- 20.5
Georgia	21	449	334	21.4	15.9	- 25.6
Illinois	31	895	969	28.9	31.2	+ 8.3
Indiana	13	474	491	36.5	37.8	+ 3.6
Kentucky	19	423	528	22.3	27.8	+ 24.8
Louisiana	23	432	405	18.8	17.6	- 6.2
Maryland	12	214	204	17.8	17.0	- 4.7
Massachusetts	3	25	11	8.3	3.7	- 56.0
Michigan	8	207	232	25.9	29.0	+ 12.1
Mississippi	21	547	667	26.0	31.8	+ 21.9
New Jersey	6	76	85	12.7	14.2	+ 11.8
New York	9	289	239	32.1	26.5	- 17.3
North Carolina	21	513	475	24.4	22.6	- 7.4
Ohio	9	227	273	25.2	30.3	+ 20.3
Pennsylvania	12	226	198	18.8	16.5	- 12.4
South Carolina	19	570	600	30.0	31.6	+ 5.3
Tennessee	24	837	761	34.9	31.7	- 9.1
Virginia	9	310	391	34.4	43.4	+ 26.1
West Virginia	1	9	4	9.0	4.0	- 55.6
Wisconsin	15	563	510	37.5	34.0	- 9.4
TOTAL	340	8,581	8,689	25.2	25.6	+ 1.2
WEIGHTED AVERAGE				27.3	27.8	+ 1.8

TABLE 2 - Summary of Doves Seen Along Call-Count Routes in the Eastern Group of States, 1957 and 1958

State	No. of Routes	Total Seen		Average Per Route		Percent Change
		1957	1958	1957	1958	
Alabama	27	481	430	17.8	15.9	- 10.6
Arkansas	12	755	1,017	62.9	84.7	+ 34.7
Connecticut	2	0	0	0	0	NC
Delaware	1	12	7	12.0	7.0	- 41.7
Florida	22	303	112	13.8	5.1	- 63.0 *
Georgia	21	401	211	19.1	10.0	- 47.8
Illinois	31	935	975	30.2	31.4	+ 4.3
Indiana	13	611	476	47.0	36.6	- 22.1
Kentucky	19	537	456	28.3	24.0	- 15.1
Louisiana	23	286	258	12.4	11.2	- 9.8
Maryland	12	103	63	8.6	5.2	- 38.8
Massachusetts	3	9	3	3.0	1.0	- 66.7
Michigan	8	139	135	17.4	16.9	- 2.9
Mississippi	21	603	698	28.7	33.2	+ 15.8
New Jersey	6	61	40	10.2	6.7	- 34.4
New York	9	76	58	8.4	6.4	- 23.7
North Carolina	21	437	311	20.8	14.8	- 28.8
Ohio	9	176	186	19.6	20.7	+ 5.7
Pennsylvania	12	90	92	7.5	7.7	+ 2.2
South Carolina	19	559	505	29.4	26.6	- 9.7
Tennessee	24	659	571	27.4	23.8	- 13.4
Virginia	9	279	164	31.0	18.2	- 41.2
West Virginia	1	3	4	3.0	4.0	+ 33.3
Wisconsin	15	98	148	6.5	9.9	+ 51.0
TOTAL	340	7,613	6,920	22.4	20.4	- 9.1
WEIGHTED AVERAGE				25.5	24.5	- 3.9

* Significant at the 95 percent level of probability.

TABLE 3 - Summary of Doves Heard Along Call-Count Routes in the Western Group of States, 1957 and 1958

State	No. of Routes	Total Heard		Average Per Route		Percent Change
		1957	1958	1957	1958	
Arizona	10	304	285	30.4	28.5	- 6.2
California	29	986	1,106	34.0	38.1	+ 12.2
Colorado	17	892	719	52.5	42.3	- 19.4
Idaho	13	372	328	28.6	25.2	- 11.8
Iowa	6	376	330	62.7	55.0	- 12.2
Kansas	33	1,501	1,508	45.5	45.7	N.C.
Minnesota	10	351	306	35.1	30.6	- 12.8
Missouri	18	1,115	963	61.9	53.5	- 13.6
Montana	12	441	458	36.7	38.2	+ 3.8
Nebraska	7	304	199	43.4	28.4	- 34.5
Nevada	13	378	245	29.1	18.8	- 35.2
New Mexico	7	267	284	38.1	40.6	+ 6.4
North Dakota	18	435	533	24.1	29.6	+ 22.5
Oklahoma	10	267	292	26.7	29.2	+ 9.4
Oregon	15	523	445	34.9	29.7	- 14.9
South Dakota	8	595	415	74.4	51.9	- 30.3
Texas	42	2,296	2,269	54.7	54.0	- 1.2
Utah	14	328	216	23.4	15.4	- 34.2
Washington	16	950	832	59.4	52.0	- 12.4
Wyoming	17	415	305	24.4	17.9	- 26.5
TOTAL	315	13,096	12,038	41.6	38.2	- 8.1
WEIGHTED AVERAGE -				44.5	39.9	- 10.3

TABLE 4 - Summary of Doves Seen Along Call-Count Routes in the Western Group of States, 1957 and 1958

State	No. of Routes	Total Seen		Average Per Route		Percent Change
		1957	1958	1957	1958	
Arizona	10	985	793	98.5	79.3	- 19.5
California	29	3,238	2,704	111.6	93.2	- 16.5
Colorado	17	890	613	52.3	36.0	- 31.1
Idaho	13	320	418	24.6	32.2	+ 30.6
Iowa	6	227	225	37.8	37.5	- 0.9
Kansas	33	1,591	1,880	48.2	57.0	+ 18.2
Minnesota	10	129	178	12.9	17.8	+ 38.0
Missouri	18	1,100	1,215	61.1	67.5	+ 10.4
Montana	12	222	132	18.5	11.0	- 40.6
Nebraska	7	535	363	76.4	51.8	- 32.2
Nevada	13	246	140	18.9	10.8	- 43.1
New Mexico	7	373	227	53.3	32.4	- 39.2
North Dakota	18	241	247	13.4	13.7	+ 2.5
Oklahoma	10	324	320	32.4	32.0	- 1.2
Oregon	15	299	319	19.9	21.3	+ 6.7
South Dakota	8	260	231	32.5	28.9	- 11.2
Texas	42	3,631	4,134	86.4	98.4	+ 13.8
Utah	11	236	234	21.4	21.3	- 0.8
Washington	16	908	1,485	56.8	92.8	+ 63.5*
Wyoming	17	525	443	30.9	26.0	- 15.6
TOTAL	312	16,280	16,301	52.2	52.2	N.C.
WEIGHTED AVERAGE -				56.3	53.9	- 4.3

* Significant at the 99 percent level of probability.

TABLE 5 - Factors for Weighting Mourning Dove Data

Eastern Group of States

State	Average Calls Per Route* (1)	Estimated Dove Habitat (Sq.mi.) (2)	Dove Index (1) Times (1) (thousands)	Percent of Total (Weighting Factor)
Ala.	20.0**	51,078	1,022	5.6
Ark.	28.0	52,725	1,476	8.1
Conn.	7.3	3,919	29	.2
Del.	30.8	1,978	61	.3
Fla.	15.3	54,262	830	4.5
Ga.	19.4**	58,518	1,135	6.2
Ill.	23.3	55,947	1,304	7.1
Ind.	36.7	36,205	1,332	7.3
Ky.	20.1**	40,109	806	4.4
La.	24.0	45,177	1,084	5.9
Md.	20.6	9,393	193	1.1
Mass.	4.3	1,977	8	.1
Mich.	23.2	28,511	661	3.6
Miss.	23.8**	47,420	1,128	6.2
N. J.	12.7	7,522	96	.5
N. Y.	27.9	11,982	334	1.8
N. C.	24.5**	44,232	1,084	5.9
Ohio	20.7	41,122	851	4.6
Pa.	11.0	23,465	258	1.4
S. C.	25.5**	30,594	780	4.3
Tenn.	28.7**	41,961	1,204	6.6
Va.	21.9	37,904	830	4.5
W. Va.	10.3	16,863	174	1.0
Wisc.	42.0	38,300	1,609	8.8
TOTAL			18,289	100.0

*Average of data from 1954-1957.
**Average of 1957 Random Call Count Survey only.

Table 5--Continued:

Western Group of States

State	Average Calls Per Route* (1)	Estimated Dove Habitat (Sq.mi.) (2)	Dove Index (1) Times (1) (thousands)	Percent of Total (Weighting Factor)
Ariz.	37.0	113,580	4,202	6.3
Calif.	33.6	141,123	4,742	7.1
Colo.	41.5	72,777	3,020	4.5
Idaho	30.4	49,685	1,510	2.2
Iowa	45.8	55,986	2,564	3.8
Kan.	40.0	92,113	3,684	5.5
Minn.	35.2	60,007	2,112	3.2
Mo.	47.8	69,270	3,311	4.9
Mont.	28.4	124,369	3,532	5.3
Nebr.	50.0	76,653	3,833	5.7
Nev.	28.2	108,704	3,065	4.6
N. Mex.	31.1	109,360	3,401	5.1
N. Dak.	19.5	70,054	1,366	2.0
Okla.	26.9	69,283	1,863	2.8
Oreg.	31.3	72,263	2,261	3.4
S. Dak.	61.0	73,475	4,482	6.6
Texas	46.2	263,644	12,180	18.2
Utah	37.0	74,111	2,742	4.1
Wash.	43.0	46,884	2,016	3.0
Wyo.	13.9	82,080	1,141	1.7
TOTAL			67,027	100.0

*Average of data from 1954-1957.

Table 6 - Weighted First Year Recoveries in States Permitting Hunting of Nestlings Banded from 1952-57 (Part 1)

Banded In	Ala.	Ariz.	Ark.	Calif.	Colo.	Del.	Fla.	Ga.	Ill.	Kans.	Ky.	La.	Md.	Miss.
Ala.	14.5						.6	.6				1.2		
Ariz.		70.5												
Ark.	2.7		10.8				2.7					2.7		
Calif.				74.0										
Del.						.7							.2	
Fla.							13.6							
Ga.														
Idaho														
Ill.	2.2		.3				3.8		10.8		.3	1.9		.5
Ind.	2.6						4.4	2.6	1.7		.9	1.7		
Iowa	1.5						4.5			1.5		1.5		
Kans.										23.4				
Ky.	.9						.7	.2			9.8	.4		
La.							1.3					15.0		
Md.													1.6	
Mass.	.1													
Mich.	3.2						4.3					1.1		
Minn.												4.4		
Miss.	.7		.2				1.9	.2				1.5		12.9
Mo.	2.2						1.5	.7		.7	1.5	1.5		
Mont.														
Neb.										2.2		2.4		
N. M.														
N. C.								3.0						
N. D.	.5				.6		.6	.6		1.2				
Ohio	1.7		.3				3.4	1.3				1.4		.7
Okla.	2.3													
Oreg.														
Pa.								.8				.2		
S. C.								1.8						
S. D.										3.2				
Tenn.								.8				1.6		
Tex.	.5						.5	.5				.3		
Utah		11.1												
Va.														
Wash.				9.0										
Wisc.	1.6						8.2		1.6	1.6		4.9		3.3
Wyo.														
TOTAL	37.2	81.6	11.6	83.0	.6	.7	52.1	13.1	14.1	33.8	12.5	43.7	1.8	17.4

Table [illegible] - Continued

Banded In	Mo.	Nev.	N.M.	N.C.	Okla.	Oreg.	Pa.	S.C.	Tenn.	Tex.	Utah.	Va.	Wash.	Mex.	TOTAL
Ala.															16.9
Ariz.															70.5
Ark.	2.7									2.7					24.3
Calif.														3.5	77.5
Del.															.9
Fla.															13.6
Ga.															0
Idaho														25.2	25.2
Ill.	.3									1.6					21.7
Ind.										.9		.9			15.7
Iowa					1.5					10.5				9.0	30.0
Kan.					10.0					13.4				13.4	60.2
Ky.	.1			.1				.1	.4	.1					12.8
La.										1.3					17.6
Md.								1.6							3.2
Mass.				.1											.2
Mich.										1.1					9.7
Minn.			4.4							13.0					21.8
Miss.										1.2					18.9
Mo.	33.3				1.5			.7	.7	6.7				3.0	54.0
Mont.														59.1	59.1
Neb.					2.2					22.4				26.9	55.9
N. M.			41.3											13.8	55.1
N. C.				14.8											17.8
N. D.			.6							7.8				8.4	20.4
Ohio								.7		.3		.3			9.8
Okla.					14.0					14.0					30.3
Oreg.						18.9							18.9		37.8
Pa.				.6			2.5								4.1
S. C.								11.0							12.8
S. D.										35.0				31.8	70.0
Tenn.	.8								16.4						19.6
Tex.			1.5		1.0					181.5				14.5	200.5
Utah											22.1			11.1	44.3
Va.								13.9							13.9
Wash.		1.5											18.0	4.5	33.0
Wisc.				1.6											22.8
Wyo.														19.1	19.1
TOTAL	37.2	1.5	47.8	17.2	30.2	18.9	2.5	28.0	17.5	313.5	22.1	1.2	36.9	243.3	1221.0

TABLE 7 - Hunter Kill of Mourning Doves, 1955-56 and 1956-57 Seasons

State	Estimated Kill		Source of Dove Kill Figures			
	1955-56	1956-57	Mail Questionnaire	Hunter Interview	Field Bag Checks	General Observations
Arizona	790,014	468,000		x	x	x
California	2,571,500	2,808,600	x			
Colorado	147,742	210,036	x			
Delaware	3,600	3,000		x		x
Florida	1,550,000	1,900,000	x			
Idaho	122,626	129,749	x			
Kentucky	865,000	1,097,000		x	x	
Louisiana	1,000,000	1,200,000	x			
Mississippi	1,000,000	850,000	x			
Missouri	248,152	304,500			x	
Nevada	53,000	104,700	x			
North Carolina	450,000	461,505	x		x	
Oregon	25,000	30,000			x	
New Mexico	20,000	-		x	x	x
Pennsylvania	21,033	24,838		x	x	x
South Carolina	-	750,000				x
Tennessee	750,000	750,000	x		x	
Texas	4,172,400	4,000,000			x	x
Utah	79,444	95,729	x			
Virginia	65,000	-		x	x	x
Washington	139,600	159,300	x			
Wyoming	-	27,000	x			x
TOTAL	14,074,111	15,373,957	12	6	10	8
Comparable Total	13,989,111	14,596,957				
Percent Change		+ 4.3%				

TABLE 8 - Comparative Distribution of Dove Kill Among Eight States as Determined by Mail Surveys and Weighted Band Recoveries

State	Average Kill*	Weighted Band Recoveries	% of Total Based On: Kill Estimate	% of Total Based On: Band Recovery
California	2,663,000	83.0	33.8	35.6
Colorado	179,000	.6	2.3	.3
Florida	1,725,000	52.1	21.9	22.4
Louisiana	1,100,000	43.7	14.0	18.7
Mississippi	925,000	17.4	11.7	7.5
Nevada	79,000	1.5	1.0	.6
North Carolina	456,000	17.2	5.8	7.4
Tennessee	750,000	17.5	9.5	7.5
TOTAL	7,877,000	233.0	100.0	100.0

* Data from 1955-56 and 1956-57 Seasons.

Summary of Routes by States

ALABAMA

Rt. No.	County	Heard 1957	Heard 1958	Seen 1957	Seen 1958
5R	Madison	48	28	25	14
8R	Colbert Franklin	14	19	12	16
20R	Morgan Marshall	38	29	45	8
22R	Cherokee-Etowah	48	52	36	37
23R	Cherokee-Dekalb	22	48	39	13
29R	Etowah	20	37	4	2
34R	Walker	21	54	101	115
35R	Jefferson	18	15	16	33
43R	Jefferson	19	21	2	9
47R	Claburne-Randolph	11	19	12	9
52R	Shelby-Bibb	5	7	2	1
59R	Hale-Perry	15	12	10	0
63R	Coosa-Elmore	7	4	6	2
69R	Perry-Hale	74	80	33	36
75R	Lee-Mason	6	7	24	4
76R	Lee	13	6	3	1
77R	Choctaw	28	47	20	17
81R	Dallas	26	18	0	15
89R	Wilcox	13	14	5	5
90R	Wilcox-Butler	16	20	2	3
96R	Choctaw-Washington	16	17	11	7
99R	Monroe	6	5	4	2
103R	Pike-Coffee	12	12	30	17
105R	Barbour-Henry	17	22	30	22
107R	Clarke	17	23	6	7
116R	Washington-Mobile	20	3	0	4
121R	Covington	21	26	3	31

ARIZONA

1	Graham	62	42	230	237
3	Santa Cruz	29	17	12	11
4	Pima	14	15	24	37
6	Maricopa	41	30	403	257
8	Maricopa	33	27	13	8
10	Pima	30	27	30	40
11	Greenlee	33	40	97	93
18	Navajo	14	19	11	13
19	Yuma	42	56	156	85
21	Cochise	6	12	9	12

ARKANSAS

1	Arkansas	68	70	57	180
2	Arkansas	54	52	56	157
3	Craighead	38	33	245	224
4	Craighead	57	47	228	236
5	Ouachita	18	20	47	39
6	Ouachita	19	14	50	44
7	Arkansas	27	24	25	92
8	Montgomery	5	3	11	8
9	Scott	9	7	8	2
10	Marion	13	24	3	9
11	Madison	32	35	13	11
12	Van Buren	23	46	12	15

Continued --

CALIFORNIA

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Los Angeles	20	20	57	42
2	Los Angeles	29	32	41	42
3	Sutter	30	29	56	27
4	Butte	41	76	160	117
5	Humboldt	4	0	4	4
6	Modoc	11	7	18	27
7	Tehama-Shasta	9	35	49	24
8	Imperial	58	81	867	373
9	Imperial	43	58	193	358
10	Imperial	42	51	139	174
11	Riverside	61	43	399	417
12	Ventura	47	32	28	35
13	Los Angeles	63	40	12	17
14	Colusa	20	22	32	24
15	San-Joaquin	4	6	28	22
16	Sacramento	7	5	10	16
17	Modoc	62	49	67	10
18	Merced	6	5	10	17
19	Imperial	148	116	876	672
20	Santa Cruz	16	25	5	7
21	Monterey	42	102	23	29
23	Alameda-Santa Clara	41	42	14	16
24	Santa Clara	29	38	2	33
27	San-Bernardino	2	8	14	12
28	Imperial	15	17	13	37
29	Riverside	22	11	10	12
30	Sacramento	16	21	48	38
31	El Dorado	25	26	26	29
32	Kern	73	109	37	73

COLORADO

1	Crowley	37	35	40	64
3	Alamosa	22	0	20	1
4	Otero	53	47	100	95
5	Bert	39	16	74	17
6	Prowers	6	36	59	15
8	Adams	73	110	48	63
9	Arapahoe	158	124	124	88
10	Weld	65	91	65	71
11	Moffat	17	15	2	1
12	Douglas	21	31	23	34
13	Larimer-Weld	37	26	35	13
15	Larimer	122	55	20	14
16	Phillips	7	46	11	14
20	Mesa	51	32	64	63
21	Montrose	18	15	34	28
22	Montezuma	133	4	136	12
23	Boulder	33	36	35	20

CONNECTICUT

1	Hartford	12	10	0	0
2	New Haven	6	4	0	0

Continued --

DELAWARE

Rt.		Heard		Seen	
No.	County	1957	1958	1957	1958
1	Kent	31	30	12	7

FLORIDA

Rt.		Heard		Seen	
No.	County	1957	1958	1957	1958
1	Dade	15	11	3	4
2	Charlotte	25	29	2	2
3	Lee	3	4	0	0
5	Polk	11	13	2	2
6	Marion	13	24	1	0
7	Levy	14	12	12	27
8	Lafayette	13	8	2	2
9	Volusia	10	12	0	0
11	Gadsden-Leon	14	15	7	4
12	Bay	3	2	0	0
13	Washington	18	7	12	10
14	Walton	18	5	41	2
15	Santa Rosa	21	8	31	0
16	Franklin	20	2	49	0
17	Leon	21	5	48	0
18	Levy-Martin	15	13	13	11
19	Levy-Alachua	22	7	10	10
20	Polk	16	7	9	9
21	Orange	17	30	26	22
22	Alachua	12	18	7	2
23	Alachua	6	8	4	2
24	Alachua	5	8	24	3

GEORGIA

Rt.		Heard		Seen	
No.	County	1957	1958	1957	1958
16R	Gordon-Bartow	28	35	18	16
18R	Emerson-Forsyth	9	11	10	5
25R	Cobb-Cherokee	14	11	9	8
27R	Gwinnett-Barrow	12	18	3	5
28R	Jackson-Barrow	54	28	31	18
29R	Madison-Oglethorpe	29	31	26	39
31R	Haralson-Carroll	18	15	18	10
33R	Walton	48	26	163	19
34R	Oconee	63	20	18	9
38R	Heard	21	9	16	7
47R	Troupe-Chambers	16	15	8	8
60R	Upson	13	12	9	8
67R	Screven-Jenkins	14	10	9	3
79R	Chattahoochee-Stewart	8	1	2	1
85R	Laurens-Wheeler	26	28	12	6
90R	Effingham	18	5	5	1
105R	Worth-Turner	22	12	26	10
111R	Wayne	5	13	5	13
118R	Irvin-Berrien	4	16	4	20
121R	Pierce	14	12	5	5
140R	Lowndes	13	6	4	0

Continued --

IDAHO

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Bingham	22	24	23	26
4	Bannoch	39	28	21	27
5	Power	34	11	10	8
7	Nez Perce	34	22	41	90
8	Ada-Canyon	24	30	19	52
10	Nez Perce	26	22	17	54
11	Nez Perce	43	52	27	36

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
14	Jefferson	16	34	55	26
15	Bonneville	15	32	78	33
16	Canyon	22	36	18	51
18	Franklin	47	17	11	4
22	Bonner-Kootenai	27	13	0	5
23	Benewah	23	7	0	6

ILLINOIS

1	Cooke-Lake	26	20	8	9
2	Lake	23	20	11	10
3	Williamson	64	44	27	45
4	Williamson-Jackson	62	50	42	32
5	Ogle	29	27	19	31
6	Ogle	27	34	11	21
7	Hancock	37	63	60	60
8	Marshall-Putnam	8	12	8	11
9	Fulton-McDonough	23	58	41	31
10	Union	33	34	17	16
11	Macon	6	23	3	24
12	Ogle	11	8	9	8
13	Washington	71	53	53	47
14	Lawrence	61	55	108	76
15	Champaign	4	10	16	30
16	Whiteside	5	13	21	13

17	Madison	21	15	41	36
18	Madison Jersey	21	31	18	33
19	DeKalb	5	1	4	8
20	Mason	49	52	40	45
21	Mason	62	56	40	44
22	St. Clair	27	30	54	50
23	St. Clair	26	17	26	40
24	St. Clair-Monroe	32	21	35	19
25	Lee	7	10	5	21
26	Lee	20	12	8	9
27	St. Clair	50	76	126	81
30	Winnebago	10	16	8	22
31	Winnebago	35	44	27	19
32	St. Clair-Madison	0	31	34	55
33	Tazewell	40	33	15	29

INDIANA

1	Whitley	46	34	26	33
2	Whitley	25	52	3	8
4	Daviess	41	75	165	94
5	Hendricks	16	19	50	25
6	Hendricks	17	17	56	41
7	Jasper-Pulaski	43	49	19	18

8	Lawrence-Orange	39	59	118	76
9	Jackson	33	35	49	67
10	Newton	18	24	9	25
11	Newton	66	30	25	26
12	Wayne	39	42	37	32
13	Fulton	41	21	34	14
14	Grant	50	34	20	17

Continued --

IOWA

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Clay	1	54	25	24
2	Clay (North)	2	67	18	39
9	Polk-Dallas	61	39	49	44
10	Mills-Fremont	196	49	64	37
11	Lee	45	44	55	53
17	Kossuth	71	77	16	28

KANSAS

1	Reno	69	90	82	80
2	Sedgwick	96	47	88	39
3	Barton	29	50	31	80
4	Saline	72	64	184	69
5	Shawnee	71	57	34	51
6	Montgomery	21	54	71	37
7	Cloud	86	59	112	69
8	Marshall	101	74	67	139
9	Lyons	59	42	37	32
10	Crawford	66	57	56	31
11	Barber	33	79	19	50
12	Linn	44	46	33	59
13	Franklin	43	39	55	48
14	Russell	60	25	49	61
16	Rush	27	48	18	47
17	Ness	49	19	17	28
18	Finney	4	18	5	8
19	Finney	22	75	43	74
20	Pratt	87	68	39	99
23	Atchison	64	15	125	151
25	Morton	7	7	5	10
27	Pottawatomie	50	57	62	86
29	Clay	53	43	48	94
30	Smith	61	35	63	89
31	Hodgeman	52	25	12	11
32	Graham	19	62	57	53
33	Ford	3	34	14	25
34	Grant	3	6	7	6
35	Rawlins	48	64	35	20
36	Gove	39	77	66	124
37	Greenwood	15	27	30	31
38	Hamilton	28	27	12	54
39	Meade	20	18	15	25

KENTUCKY

1R	Kenton-Pendleton	9	45	14	25
2R	Trimble-Henry	18	32	30	28
20R	Spender-Nelson	33	25	20	7
23R	Bath-Montgomery	8	34	4	2
25R	Lawrence-Johnson	2	7	0	1
27R	Henderson	51	48	96	55
34R	Washington	13	21	14	1
41R	Floyd	3	7	0	0
43R	Crittendon	30	31	38	66
49R	Hart	23	41	30	18
53R	Lincoln-Rockcastle	13	18	5	5
60R	Ballard-McCracken	38	29	60	54
64R	Mahlenburg-Logan	33	39	22	37
78R	Lyon-Trigg	31	33	75	80
79R	Christian	38	40	34	28
82R	Logan-Warren	28	27	53	17

Continued --

KENTUCKY - Continued --

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
92R	Graves-Weakley(Tenn.)	46	41	42	32
95R	Whitley-Campbell(Tenn.)	5	8	0	0
96R	Bell	1	2	0	0

LOUISIANA

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Sabine-Vernon	5	16	15	9
3	Acadia	7	0	1	1
5	E. Baton-Rouge	3	2	9	1
8	Tangipahoa	4	5	4	2
9	Concordia	30	46	7	16
10	Caldwell-Ouachita	22	12	16	7
12	Rapides	12	8	6	7
13	Vernon-Natchitoches	25	24	8	3
14	Natchitoches	18	19	13	2
15	Lafayette	4	15	5	16
16	Vermilion	1	3	5	7
17	Morehouse	36	57	25	14
18	W. Baton-Rouge	7	13	23	21
19	Terrebonne	0	17	1	19
20	Rapides	28	8	36	20
21	Rapides	47	25	22	45
24	Grant	31	25	10	9
25	Vernon	12	27	15	7
26	Lafayette	21	21	12	18
27	Lafayette-St. Martin	29	4	19	5
29	Pointe-Coupee	36	27	5	12
30	Union	13	8	20	9
32	Vernon	41	23	9	8

MARYLAND

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Howard	32	40	8	7
2	Prince-George	24	23	7	1
3	Washington	13	13	14	8
4	Howard	24	16	24	9
5	Prince-George	28	22	7	13
6	Cecil	10	10	16	4
7	Kent	9	8	4	6
8	Queen Anne	16	14	12	8
9	Caroline	17	21	1	4
10	Talbot	17	11	0	1
11	Dorchester	14	14	8	0
12	Wicomico	10	12	2	2

MASSACHUSETTS

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Essex	12	6	1	1
2	Plymouth-Bristol	2	5	0	2
3	Bristol	11	0	8	0

Continued --

MICHIGAN

Rt. No.	County	Heard 1957	Heard 1958	Seen 1957	Seen 1958
1	Washtenaw	22	43	20	44
2	Washtenaw	37	59	27	33
4	Tuscola	26	12	10	6
5	Tuscola	7	7	6	0
6	Monroe	36	17	29	17
8	Monroe	13	35	12	9
13	Ingham	18	11	9	5
24	Allegan	48	48	26	21

MINNESOTA

1	Jackson	22	41	12	19
5	Olmstead	39	18	15	14
6	Olmstead	34	29	15	19
7	Scott	27	42	12	55
8	Polk-Red Lake	27	22	12	8
9	Beltrami	10	9	4	3
10	Dakota	47	22	18	14
12	Dodge	49	55	14	10
17	Roseau	34	17	3	3
18	Kandiyohi	62	51	24	33

MISSISSIPPI

7R	Tishomingo-Alcorn	37	27	4	16
12R	Union	20	35	21	22
13R	Poentiss-Lee	11	41	11	32
15R	Cashema-Bolivar	70	67	105	27
22R	Itawamba	21	22	14	20
25R	Tallahatchie	21	51	59	104
28R	Chickasaw	20	35	10	23
33R	Sunflower-Leflore	26	42	41	47
35R	Montgomery	34	43	46	57
43R	Carroll-Holmes	36	67	36	72
50R	Holmes-Yazoo	43	21	43	69
56R	Sharkey-Issaquena	29	21	39	25
73R	Rankin	17	7	19	22
74R	Smith	37	18	39	14
78R	Jefferson	19	23	3	7
89R	Lincoln	19	16	16	26
94R	Wayne	10	14	7	7
95R	Wayne	31	22	8	13
101R	Lamar-Marion	21	23	26	34
113R	Hancock	9	6	18	20
115R	Jackson	16	16	38	41

Continued - -

MISSOURI

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Boone	102	71	66	68
2	Boone-Callaway	70	122	80	51
3	Callaway	84	75	101	57
4	Cole	42	59	20	57
5	Cape-Girardeau	25	38	33	39
7	Howell-Douglas	42	35	6	11
8	Texas	37	23	8	8
9	Green	45	27	39	33
10	Green	30	17	46	124
11	St. Charles	31	39	65	45
13	De Kalb-Daviess	159	74	104	60
14	Daviess-Caldwell	121	79	69	65
15	Lawrence	53	25	69	101
16	Lawrence	66	27	203	105
17	Marion	67	59	47	77
18	Marion	56	69	63	111
19	Chariton	57	104	44	171
21	St. Charles	28	20	37	32

MONTANA

1	Yellowstone	21	28	21	10
2	Lewis-Clark	23	22	6	18
5	Valley	22	21	50	12
8	Phillips	107	123	71	13
9	Phillips	133	156	13	21
10	Phillips	27	10	6	18
11	Sheridan	2	2	0	0
13	Sheridan-Roosevelt	11	3	18	0
14	Madison	12	21	16	17
16	Powell	0	0	0	0
17	Lincoln	7	0	0	2
20	Powder River	76	72	21	21

NEBRASKA

3	Adams	43	15	72	82
4	Adams	39	14	63	62
5	Hamilton	70	37	136	76
9	Frontier	13	36	73	10
10	Red Willow	37	43	31	16
11	Platte	86	34	98	32
12	Lincoln	16	20	62	85

NEVADA

1	Churchill	71	32	75	16
3	Clark-Mohave	23	19	18	8
4	Clark	15	24	30	21
5	Clark	2	20	3	46
6	Elko-White Pine	59	36	1	0

Continued --

NEVADA - Continued --

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958			1957	1958	1957	1958
7	Elko	14	18	24	35	16	Washoe	28	18	0	1
8	Lyon	38	6	7	1	21	Lander	17	3	55	0
9	Washoe	77	26	18	8	22	Lander	4	5	2	0
15	Elko	26	33	1	0	23	Elko	4	5	12	4

NEW JERSEY

1	Sussex	9	5	9	4	5	Cumberland	5	2	4	7
3	Hunterdon	15	14	23	6	7	Salem	27	39	0	3
4	Hunterdon	15	9	22	15	9	Ocean	5	16	3	5

NEW MEXICO

5	Dona Ana	62	16	212	38	14	Rio Arriba	22	18	8	0
10	Chaves	23	50	62	53	16	Socorro	33	42	8	67
12	Chaves	76	103	38	27	31	Socorro	43	45	43	35
13	Taos	8	10	2	7						

NEW YORK

1	Niagara	72	55	20	10	6	Seneca	7	2	4	6
2	Niagara	75	64	11	8	7	Suffolk	21	18	8	1
3	Orleans-Genessee	45	45	13	9	8	Jefferson	24	11	2	2
4	Wayne	18	17	13	17	10	Albany	21	5	2	3
						14	Ulster	6	22	3	2

Continued --

NORTH CAROLINA

Rt. No.	County	Heard 1957	Heard 1958	Seen 1957	Seen 1958
16R	Hertford-Gates	23	24	13	4
22R	Surry-Yadkin	41	28	50	36
24R	Guilford-Caswell	16	19	41	18
26R	Durham-Person	19	7	9	5
36R	Wilkes-Caldwell	35	16	11	2
52R	Madison-Buncombe	2	4	2	2
54R	Burke	13	3	2	2
58R	Davidson	30	31	9	16
0R	Randolph-Chatham	15	21	38	19
3R	Wake-Johnson	15	28	30	12

Rt. No.	County	Heard 1957	Heard 1958	Seen 1957	Seen 1958
65R	Wilson-Greene	83	46	16	16
70R	Macon	2	2	0	1
77R	Macklinburg-Cabarrus	27	25	24	35
80R	Montgomery-Moore	10	26	52	15
85R	Wayne-Duplin	69	70	37	43
92R	Jackson	1	2	0	1
96R	Richmond-Montgomery	22	31	25	9
98R	Hoke	28	32	4	16
99R	Cumberland	29	22	4	14
101R	Sampson	19	18	48	20
112R	Onslow	14	20	22	25

NORTH DAKOTA

2	Burleigh	80	73	23	26
3	McHenry-Bottineau	54	19	18	17
5	Stutsman	16	18	31	11
6	Stutsman	5	25	13	36
8	Ward-Renville	14	68	6	4
9	Ward	33	58	2	8
4	Burke	6	33	4	5
5	Burke-Ward	4	13	1	1
5	Williams	9	7	8	1

17	Williams	9	5	7	6
18	Walsh-Pembina	26	34	23	24
20	Sargent	82	95	18	31
21	Ward	19	4	14	1
22	Mountrail	10	8	17	9
23	Starke	20	30	10	13
24	Golden Valley	11	9	13	13
25	Kidder	16	18	17	14
26	McLean	21	16	16	27

OHIO

	Ottawa	26	15	12	19
	Franklin	10	21	24	16
	Franklin	8	14	38	23
	Franklin	20	13	6	17
	Pickaway-Rose	39	56	34	19

12	Wood	24	24	16	26
13	Wood	29	31	9	12
14	Wood	18	26	9	16
16	Champaign	53	73	28	38

Continued --

OKLAHOMA

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
1	Oklahoma-Canadian	39	55	28	16
2	Tulsa-Rogers	13	15	37	56
3	Pittsburg-Latimer	14	20	16	36
4	Wagoner	24	16	57	35
6	Comanche	40	33	9	4
7	Caddo	12	27	22	52
9	McIntosh	19	24	16	37
10	Kingfisher	64	52	109	54
12	Grady	25	29	5	13
13	Muskogee	17	21	25	17

OREGON

1	Umatilla	16	31	22	24
2	Jackson	20	15	23	39
3	Umatilla	101	47	48	41
4	Yamhill-Polk	19	10	14	24
5	Klamath	57	58	13	5
6	Deschutes	48	18	11	9
8	Linn	14	11	15	6
9	Douglas	66	88	6	5
12	Grant	50	55	28	42
13	Baker	7	9	24	19
14	Harney	13	24	17	24
15	Malheur	18	3	22	18
17	Hood River	18	9	13	19
18	Lake	40	26	33	36
19	Jefferson	36	41	10	8

PENNSYLVANIA

2	Centre	3	7	2	0
3	Centre	7	1	5	1
5	Elk	1	2	0	0
6	Elk-Jefferson	2	0	1	1
8	Lycoming-Clinton	2	1	1	3
10	Franklin	44	45	0	5
11	Lancaster	29	17	24	20
12	Lancaster	23	25	23	27
13	York	22	24	17	21
14	Perry	21	15	5	1
15	Perry	15	6	4	9
18	Franklin	57	55	8	4

SOUTH CAROLINA

4R	Cherokee-Cleveland(NC)	40	58	106	112
6R	Oconee-Rabun (GA.)	16	8	0	0
10R	Union-Chester	24	33	8	7
14R	Chesterfield	67	86	102	29

Continued --

SOUTH CAROLINA - Continued --

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
18R	Laurens	65	27	103	20
25R	Marlboro	69	58	29	173
27R	Abbeville	32	35	15	13
32R	Kershaw-Richland	18	14	29	4
47R	Horry	33	53	13	19
48R	Edgefield	12	14	9	2
50R	Aiken	24	60	31	60
51R	Orangeburg-Aiken	39	20	8	10
53R	Clarendon	42	28	43	13
54R	Clarendon-Williamsburg	24	19	2	0
59R	Orangeburg	41	29	26	8
60R	Orangeburg	2	11	22	31
70R	Barkely-Charleston	4	5	2	0
71R	Hampton-Jasper	17	41	8	3
73R	Charleston-Dorchester	1	1	3	1

SOUTH DAKOTA

1	Brown	59	43	42	35
2	Brown	43	44	30	63
3	Hanson-Davison	76	83	21	35
4	Aurora	152	46	26	16
7	Corson	52	23	34	9
8	Hughes	93	63	22	24
9	Kingsbury	35	65	32	15
10	Lyman	85	48	53	34

TENNESSEE

6R	Macon-Allen(Ky.)	22	36	24	45
7R	Clay-Jackson	40	13	35	6
9R	Pickett-Wayne	26	43	17	24
10R	Scott-McCreary	2	1	2	0
14R	Dyer	58	45	25	18
20R	Dickson	37	40	46	48
23R	Smith	75	66	45	44
24R	Jackson	27	27	18	16
29R	Clairborne	27	36	14	11
31R	Hawkins	50	37	42	36
36R	Gibson	84	29	67	39
38R	Benton	48	38	65	35
44R	DeKalb-Cannon	39	25	20	21
47R	Morgan-Cumberland	4	9	1	6
53R	Lauderdale	11	15	33	40
55R	Crockett-Haywood	42	38	32	34
57R	Henderson	45	71	38	26
61R	Maury	21	38	43	46
63R	Rutherford	78	54	34	29
67R	Cumberland-Rhea	29	29	7	5
71R	Servier	8	5	2	2
75R	Hardeman-Madison	20	39	9	29
84R	Grundy-Sequatchee	7	6	0	2
89R	Shelby	37	21	40	9

Continued --

TEXAS

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1957	1958	1957	1958	No.	County	1957	1958	1957	1958
3	Robertson	29	47	47	51	32	Childress	29	38	90	137
4	Robertson	46	45	45	27	34	Hemphill	38	59	74	131
7	Bosque	49	106	119	103	35	Hemphill	8	3	26	107
8	Bosque	64	117	30	58	42	Jefferson	36	8	89	93
9	Wilson	167	195	87	85	43	Roberts	40	69	35	69
10	Wilson	206	212	133	121	44	Roberts	35	67	35	74
13	Brazoria	35	70	191	102	48	Cameron	36	42	297	180
14	Hidalgo	41	48	251	166	49	Dewitt	45	71	44	143
16	Travis	31	13	22	10	50	Bee	40	33	279	213
18	Kleberg	116	74	180	115	51	Colorado	53	62	175	180
19	Crockett	34	37	99	94	52	Hudspeth	17	8	10	2
20	Crockett	31	24	78	107	53	El Paso	23	90	51	47
21	Val Verde	92	3	103	114	54	Reeves	25	58	7	55
22	Val Verde	52	15	53	248	55	Tarrant	10	13	50	30
23	Throckmorton	185	96	141	250	58	Brown	75	79	179	143
24	Throckmorton	95	97	144	237	59	Edwards	69	27	73	28
25	Lubbock	0	0	4	6	60	Uvalde	53	62	111	137
26	Lubbock	3	7	7	10	61	Jim Hogg	192	80	47	81
27	Webb	16	17	43	125	64	Smith	37	15	14	48
28	Jefferson	56	35	33	50	66	Nacogdoches	28	26	24	21
30	Nolan	29	57	77	84	67	Nacogdoches	30	44	34	52

UTAH

1	Box Elder	11	9	9	5	12	Iron	18	25	49	20
2	Cache	28	2	0	1	15	Salt Lake	38	8	44	15
3	Tooele	38	8	19	10	19	Garfield-Kane	3	13	20	21
4	Tooele	14	29	38	90						
6	Box Elder	26	22	4	12	23	Washington	75	23	35	0
8	San Juan	1	2	16	52	27	Weber	10	11		
10	Millard	0	3	2	8	30	Juab	11	14		
						31	Summit	55	47		

VIRGINIA

1	Alexandria-Fairfax	10	20	27	10	3	Westmoreland-Richmond	50	56	62	44
2	Fairfax	36	18	23	7						

Continued --

VIRGINIA - Continued --

Rt. No.	County	Heard		Seen	
		1957	1958	1957	1958
5	Nansemond-Isle of Wight	64	59	24	27
6	Nansemond-Isle of Wight	46	39	64	29
7	Campbell	33	39	23	8
8	Southhampton	13	82	39	31
12	Accomack	17	25	1	4
13	Culpepper	41	53	16	4

WASHINGTON

1	Spokane	51	107	9	23
2	Douglas	75	42	20	55
3	Spokane	27	85	6	6
4	Whitman	141	71	38	40
6	Okanogan	41	55	90	270
7	Skagit	0	2	0	3
8	Yakima	75	81	165	211
9	Yakima	41	51	122	235
10	Yakima	22	28	44	80
12	Yakima	20	42	53	86
13	Ferry	138	52	9	16
14	Stevens	149	68	7	25
17	Douglas	53	50	99	100
18	Chelan	26	20	86	108
19	Okanogan	63	56	92	125
20	Okanogan	28	22	68	102

WEST VIRGINIA

1	Hampshire	9	4	3	4

WISCONSIN

1	Dane-Columbia	36	39	13	21
2	Columbia	35	29	6	14
3	Iowa	36	29	3	4
4	Green	31	35	4	17
6	Dunn	40	82	13	9
7	Dunn	25	43	8	14
8	Adams	35	58	3	9
9	Sauk	48	26	4	4
10	Waushara	74	47	10	9
11	Columbia	31	27	6	11
12	Dane	28	19	2	18
13	Adams	57	15	10	4
17	Winnebago	23	10	0	1
18	Winnebago	20	10	6	3
19	Kenosha	44	41	10	10

Continued --

WYOMING

Rt.		Heard		Seen		Rt.		Heard		Seen	
No.	County	1957	1958	1957	1958	No.	County	1957	1958	1957	1958
1	Johnson	48	1	18	11	14	Bighorn	27	30	59	89
3	Natrona	44	39	9	19	15	Lincoln	0	0	0	0
4	Carbon	12	13	1	8	16	Campbell	62	40	64	93
5	Fremont	40	13	56	55	18	Fremont	43	34	162	43
6	Park	8	14	66	26	19	Albany	0	2	3	2
7	Platte	20	14	14	14	20	Park	7	1	16	13
10	Carbon	3	13	0	0	21	Laramie	37	19	17	20
11	Converse	58	66	33	37	23	Park	0	1	0	7
12	Vinta	6	5	7	6						

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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Bureau of Sport Fisheries and Wildlife
Washington 25, D. C.

Issue No. 14 June 30, 1959

MOURNING DOVE NEWSLETTER
(Not for Publication)

The mourning dove call-count survey is used to determine trends in the dove breeding population. Shooting regulations for the current year are formulated with consideration of the population status. This newsletter includes trend statistics for 1958 and 1959 plus data on long-term trends in the dove breeding population, 1953-1959.

Procedure for Determining Trends in the Breeding Population Index

The two types of data used as indexes to the dove breeding population of a State are: (1) average doves heard calling per route and (2) average doves seen per route. To calculate trends in population indexes for units larger than one State, each State index is multiplied by the estimated area of dove habitat in the State. Habitat area was estimated in the 1958 *Mourning Dove Newsletter*.

For the purpose of showing long-term trends in the dove breeding-population index of a State, a base year was selected, and annual percentage changes were applied to the base figure to give an adjusted base which shows the true relation of indexes from year to year. The selection of a base figure was necessary because not all routes are run each year. To measure year to year changes in indexes, only routes run in both years are used. The index of average doves heard calling per route was used in 1953 to 1959 trend calculations. The index of doves heard is recognized as being more consistent than the doves seen index. The base year selected was 1956, a year in which there was generally good coverage of routes. For States having random routes, 1957 was used as the base year.

The value of an adjusted-base index value can be shown by using average-doves-heard figures in Table 1 and average-doves-seen figures in Table 2. Since average-doves-heard (Table 1) has been adjusted from a base figure, the 1959 result of 13.3 for Alabama, for example, can be compared directly with any year, similarly adjusted. The same is not true of average-doves-seen figures in Table 2. These are not adjusted to a common base and are comparable only for 1958 and 1959.

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NATURAL
HISTORY SURVEY
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The 1958-1959 Survey

During the May 20 - June 10 census period, call-count routes were run by cooperators in 48 States. For the first time, routes were established in Maine, New Hampshire, Rhode Island, and Vermont. Data which were comparable for 1958 and 1959 were obtained from 677 routes.

Trends in Eastern and Western Groups of States

Recent issues of the Mourning Dove Newsletter have summarized trend statistics for two groups of States, Eastern and Western. The dividing line between the groups follows the Mississippi River south to Arkansas and then turns west to include Arkansas and Louisiana in the Eastern group.

Table 1 shows a small (-2.9 percent) decrease in the doves-heard-calling index from the 1958 level in the Eastern group of States. Many northeastern States increased, but southeastern States were down generally. Table 2 shows that Eastern States also recorded a decline (-9.5 percent) in the doves-seen index.

States of the Western group showed an increase of 14.7 percent in the doves-heard-calling index and an increase of 24.9 percent in the doves-seen index (Tables 3 and 4).

The decrease in the breeding population indexes in the Eastern group of States and the increase in the Western group are in the small-to-moderate range. The national doves-heard-calling index is up 10.8 percent over 1958 and is at its highest level since call-counts were widely established in 1953. In recognition of the many variables in the call-count survey, changes in breeding population indexes of considerably greater magnitude than recorded in 1959 are required before specific management changes are indicated.

Long-term Trends in the Breeding-population Index, 1953-59

Based on doves-heard-calling, trends in State breeding-population indexes are shown in Table 5 for 1953 through 1959. Generally, population indexes have increased over the seven years. Some States, however, such as Florida and Louisiana, have declined consistently. The national index is 27.7 percent higher in 1959 than in 1954, the first year call-count routes were run in all important dove-producing States.

Table 6 and Figure 2 present long-term trends in the breeding-population indexes for Eastern and Western groups of States and for tentative management units. The tentative management units are outlined in Figure 1 and are described in detail in Special Scientific Report: Wildlife Number 42. The general increases in breeding-population indexes since 1953-54 suggest a moderate increase in the mourning dove population of the United States over a 7-year period.

Table 1. Trends in Doves Heard Calling on Call-count Routes in the Eastern Group of States, 1958 to 1959.

State	Habitat Area (sq.mi.)	Comparable Routes	Average Heard per Route and Indexes*				Percent Change
			1958	Index	1959	Index	
Ala.	51,078	25	23.8	1,216	18.7	955	-21.6
Ark.	52,725	12	33.7	1,777	30.0	1,582	-10.9
Conn.	3,919	2	7.0	27	6.0	24	-14.3
Del.	1,978	1	30.0	59	54.0	107	+80.0
Fla.	54,262	23	11.0	597	11.0	597	0.0
Ga.	58,518	21	15.9	930	18.9	1,106	+18.9
Ill.	55,947	29	32.8	1,835	33.2	1,857	+ 1.3
Ind.	36,205	14	34.0	1,231	35.4	1,282	+ 4.0
Ky.	40,109	19	27.8	1,115	27.4	1,099	- 1.4
La.	45,177	27	15.9	718	13.8	623	-13.5
Md.	9,393	12	17.0	160	19.7	185	+15.9
Mass.	1,977	3	3.7	7	5.3	10	+43.2
Mich.	28,511	11	24.8	707	30.1	858	+21.5
Miss.	47,420	22	31.7	1,503	25.8	1,223	-18.5
N. J.	7,522	8	15.7	118	18.3	138	+16.7
N. Y.	11,982	8	25.0	300	18.7	224	-25.3
N. C.	44,232	21	22.6	1,000	27.9	1,234	+23.4
Ohio	41,122	8	24.3	999	20.3	835	-16.3
Pa.	23,465	13	13.1	307	14.3	336	+ 9.2
S. C.	30,594	19	31.6	967	30.2	924	- 4.4
Tenn.	41,961	23	31.7	1,330	26.6	1,116	-16.0
Va.	37,904	10	40.6	1,539	43.2	1,637	+ 6.3
W. Va.	16,863	1	3.4	57	4.2	71	+25.0
Wis.	38,300	15	34.3	1,314	31.6	1,210	- 7.9
TOTAL	781,164	347		19,814		19,234	- 2.9

* Average doves heard calling per route for each State is determined for comparable routes in 1958 and 1959 and is adjusted from a 1956 base. For States having random routes, 1957 is used as a base. The State index is expressed in thousands and is calculated by multiplying average doves heard calling per route times the estimated area of dove habitat in the State.

Table 2. Trends in Doves Seen on Call-count Routes in the Eastern Group of States, 1958 to 1959.

State	Habitat Area (sq.mi.)	Comparable Routes	Average Seen per Route and Indexes*				Percent Change
			1958	Index	1959	Index	
Ala.	51,078	25	15.2	776	13.3	679	-12.5
Ark.	52,725	12	84.8	4,471	32.7	1,724	-61.4
Conn.	3,919	2	0.0	0	2.0	8	+ +
Del.	1,978	1	7.0	14	14.0	28	+100.0
Fla.	54,262	23	4.9	266	6.3	342	+28.6
Ga.	58,518	21	10.0	585	12.8	749	+28.0
Ill.	55,947	29	33.0	1,846	33.1	1,852	+ .3
Ind.	36,205	14	38.7	1,401	43.9	1,589	+13.4
Ky.	40,109	19	20.4	818	22.4	898	+ 9.8
La.	45,177	27	12.2	551	11.3	511	- 7.4
Md.	9,393	12	5.2	49	7.1	67	+36.5
Mass.	1,977	3	1.0	2	5.3	10	+430.0
Mich.	28,511	11	16.5	470	16.3	465	- 1.2
Miss.	47,420	22	32.7	1,551	35.4	1,679	+ 8.2
N. J.	7,522	8	8.1	61	14.5	109	+79.0
N. Y.	11,982	8	5.5	66	6.2	74	+12.7
N. C.	44,232	21	14.8	655	19.8	876	+33.8
Ohio	41,122	8	17.3	711	26.1	1,073	+50.9
Pa.	23,465	13	5.1	120	6.7	157	+31.4
S. C.	30,594	19	26.6	814	22.2	679	-16.5
Tenn.	41,961	23	24.6	1,032	25.0	1,049	+ 1.6
Va.	37,904	10	16.5	625	18.8	713	+13.9
W. Va.	16,863	1	4.0	67	1.0	17	-75.0
Wis.	38,300	15	9.9	379	9.0	345	- 9.1
TOTAL	781,164	347		17,332		15,693	- 9.5

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* Average doves seen per route for each State is determined on comparable routes for 1958 and 1959. No adjustment from a base has been made. The State index is expressed in thousands and is calculated by multiplying average doves seen per route times the estimated area of dove habitat in the State.

Table 3. Trends in Doves Heard Calling on Call-count Routes in the Western Group of States, 1958 to 1959.

State	Habitat Area (sq.mi.)	Comparable Routes	Average Heard per Route and Indexes*				Percent Change
			1958	Index	1959	Index	
Ariz.	113,580	21	31.0	3,521	33.6	3,816	+ 8.4
Calif.	141,123	29	41.2	5,814	55.1	7,776	+33.8
Colo.	72,777	9	46.4	3,377	23.8	1,732	-48.6
Idaho	49,685	15	23.8	1,183	26.7	1,327	+12.2
Iowa	55,986	4	50.6	2,833	82.6	4,624	+63.2
Kans.	92,113	34	42.9	3,952	50.2	4,624	+17.1
Minn.	60,007	12	28.9	1,734	24.1	1,446	-16.8
Mo.	69,270	18	52.7	3,650	46.4	3,214	-12.0
Mont.	124,369	14	38.2	4,751	39.0	4,850	+ 2.0
Nebr.	76,653	5	35.1	2,691	73.4	5,626	+109.2
Nev.	108,704	19	18.1	1,968	33.2	3,609	+83.4
N. Mex.	109,360	8	24.5	2,679	32.0	3,500	+30.8
N. Dak.	70,054	18	30.3	2,123	33.1	2,319	+ 9.2
Okla.	69,283	14	55.8	3,866	55.2	3,824	- 1.1
Oreg.	72,263	12	28.8	2,081	42.3	3,057	+46.8
S. Dak.	73,475	8	51.8	3,806	47.0	3,453	- 9.2
Texas	263,644	39	50.3	13,261	48.7	12,839	- 3.2
Utah	74,111	16	28.6	2,120	43.5	3,224	+52.2
Wash.	46,884	15	42.4	1,988	51.3	2,405	+21.1
Wyo.	82,080	20	22.7	1,863	26.4	2,167	+16.5
TOTAL	1,825,421	330		69,260		79,433	+14.7

* Average doves heard calling per route for each State is determined for comparable routes in 1958 and 1959 and is adjusted from a 1956 base. For States having random routes, 1957 is used as a base. The State index is expressed in thousands and is calculated by multiplying average doves heard calling per route times the estimated area of dove habitat in the State.

Table 4. Trends in Doves Seen on Call-count Routes in the Western Group of States, 1958 to 1959.

State	Habitat Area (sq.mi.)	Comparable Routes	Average Seen per Route and Indexes*				Percent Change
			1958	Index	1959	Index	
Ariz.	113,580	21	89.5	10,165	114.3	12,982	+27.7
Calif.	141,123	29	93.2	13,153	123.2	17,386	+32.2
Colo.	72,777	9	38.8	2,824	33.2	2,416	-14.4
Idaho	49,685	15	34.0	1,689	42.3	2,102	+24.4
Iowa	55,986	4	40.5	2,267	62.5	3,499	+54.3
Kans.	92,113	34	56.4	5,195	75.7	6,973	+34.2
Minn.	60,007	12	19.8	1,188	26.6	1,596	+34.3
Mo.	69,270	18	67.5	4,676	58.1	4,025	-13.9
Mont.	124,369	14	24.8	3,084	46.0	5,721	+85.5
Nebr.	76,653	5	67.0	5,136	96.0	7,359	+43.3
Nev.	108,704	19	13.4	1,457	39.0	4,239	+191.0
N. Mex.	109,360	8	25.6	2,800	36.4	3,981	+42.2
N. Dak.	70,054	18	15.2	1,065	18.2	1,275	+19.7
Okla.	69,283	14	45.4	3,145	46.0	3,187	+ 1.3
Oreg.	72,263	12	30.2	2,182	54.1	3,909	+79.1
S. Dak.	73,475	8	28.9	2,123	39.8	2,924	+37.7
Texas	263,644	39	102.1	26,918	100.2	26,417	- 1.9
Utah	74,111	16	27.1	2,008	46.1	3,417	+70.1
Wash.	46,884	15	98.6	4,623	109.8	5,148	+11.4
Wyo.	82,080	20	24.4	2,003	42.0	3,447	+72.1
TOTAL	1,825,421	330		97,702		122,004	+24.9

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* Average doves seen per route for each State is determined on comparable routes for 1958 and 1959. No adjustment from a base has been made. The State index is expressed in thousands and is calculated by multiplying average doves seen per route times the estimated area of dove habitat in the State.

Table 5. Trends in the Dove Breeding Index 1953-59.

The first figure listed for each State by years is average doves heard calling per route for the State adjusted from a 1956 base. The base figure is adjusted by applying annual percentage changes determined from comparable routes. For States having random routes, 1957 is used as a base. The second figure for each State is an index expressed in thousands which is calculated by multiplying average doves heard calling per route times the estimated area of dove habitat in the State (habitat area given in Tables 1-4).

State	1953	1954	1955	1956	1957	1958	1959
Alabama	17.4 889	21.3 1,088	19.7 1,006	19.9 1,016	21.1 1,078	23.8 1,216	18.7 955
Arizona	30.7 3,487	31.8 3,612	29.4 3,339	40.0 4,543	33.1 3,759	31.0 3,521	33.6 3,816
Arkansas	34.6 1,824	27.1 1,429	32.0 1,687	29.4 1,550	32.6 1,719	33.7 1,777	30.0 1,582
California	37.8 5,334	34.7 4,897	30.0 4,234	34.9 4,925	36.7 5,179	41.2 5,814	55.1 7,776
Colorado	no index	46.5 3,384	50.2 3,653	70.5 5,131	57.6 4,192	46.4 3,377	23.8 1,732
Connecticut	5.0 20	0.0 0	5.6 22	5.5 22	9.0 35	7.0 27	6.0 24
Delaware	28.0 55	29.0 57	30.0 59	33.0 65	31.0 61	30.0 59	54.0 107
Florida	18.2 988	15.2 825	16.7 906	14.6 792	13.8 749	11.0 597	11.0 597
Georgia	17.2 1,007	17.3 1,012	15.5 907	22.5 1,317	21.4 1,252	15.9 930	18.9 1,106
Idaho	22.8 1,133	30.0 1,491	26.3 1,307	26.8 1,332	27.0 1,341	23.8 1,183	26.7 1,327
Illinois	23.7 1,326	19.4 1,085	19.7 1,102	22.8 1,276	30.3 1,695	32.8 1,835	33.2 1,857

State	1953	1954	1955	1956	1957	1958	1959
Indiana	23.5	42.4	35.7	29.3	32.8	34.0	35.4
	851	1,535	1,293	1,061	1,188	1,231	1,282
Iowa	28.2	32.9	41.5	44.1	57.6	50.6	82.6
	1,579	1,842	2,323	2,469	3,225	2,833	4,624
Kansas	29.3	27.7	40.6	43.4	42.9	42.9	50.2
	2,699	2,552	3,740	3,998	3,952	3,952	4,624
Kentucky	14.4	17.9	18.9	23.0	22.3	27.8	27.4
	578	718	758	923	894	1,115	1,099
Louisiana	23.0	24.7	27.4	25.2	17.0	15.9	13.8
	1,039	1,116	1,238	1,138	768	718	623
Maryland	10.1	22.2	15.9	18.6	17.8	17.0	19.7
	95	209	149	175	167	160	185
Massachusetts	3.7	6.0	2.0	1.0	8.3	3.7	5.3
	7	12	4	2	16	7	10
Michigan	13.0	16.6	21.9	20.6	22.1	24.8	30.1
	371	473	624	587	630	707	858
Minnesota	30.9	36.3	39.6	37.6	33.1	28.9	24.1
	1,854	2,178	2,376	2,256	1,986	1,734	1,446
Mississippi	15.7	18.3	20.5	21.2	26.0	31.7	25.8
	744	868	972	1,005	1,233	1,503	1,223
Missouri	26.8	29.3	42.5	50.6	61.0	52.7	46.4
	1,856	2,030	2,944	3,505	4,225	3,651	3,214
Montana	24.8	18.8	37.9	41.8	36.8	38.2	39.0
	3,084	2,338	4,714	5,199	4,577	4,751	4,850
Nebraska	82.6	62.5	55.3	43.8	53.6	35.1	73.4
	6,332	4,791	4,239	3,357	4,109	2,691	5,626
Nevada	26.2	27.5	28.4	27.2	28.0	18.1	33.2
	2,848	2,989	3,087	2,957	3,044	1,968	3,609
New Jersey	9.7	16.6	11.4	11.8	14.0	15.7	18.3
	73	125	86	89	105	118	138
New Mexico	28.7	25.8	42.8	31.7	23.0	24.5	32.0
	3,139	2,821	4,681	3,467	2,515	2,679	3,500

State	1953	1954	1955	1956	1957	1958	1959
New York	22.9 274	19.3 231	20.0 240	31.8 381	30.2 362	25.0 300	18.7 224
North Carolina	15.3 677	21.2 938	23.8 1,053	23.9 1,057	24.4 1,079	22.6 1,000	27.9 1,234
North Dakota	9.8 687	17.1 1,198	18.0 1,261	21.6 1,513	24.7 1,730	30.3 2,123	33.1 2,319
Ohio	22.0 905	27.2 1,119	22.2 913	18.2 748	20.2 831	24.3 999	20.3 835
Oklahoma	13.4 928	23.0 1,594	32.1 2,224	42.1 2,917	51.0 3,533	55.8 3,866	55.2 3,824
Oregon	38.6 2,789	24.5 1,770	30.8 2,226	29.8 2,153	33.8 2,442	28.8 2,081	42.3 3,057
Pennsylvania	9.5 223	13.7 321	11.8 277	13.2 310	15.0 352	13.1 307	14.3 336
South Carolina	18.9 578	31.2 955	29.6 906	29.6 906	30.0 918	31.6 967	30.2 924
South Dakota	29.2 2,145	38.1 2,799	60.4 4,438	50.1 3,681	74.3 5,459	51.8 3,806	47.0 3,453
Tennessee	15.2 638	19.4 814	24.7 1,036	25.1 1,053	34.9 1,464	31.7 1,330	26.6 1,116
Texas	29.7 7,830	35.7 9,412	43.1 11,363	41.2 10,862	50.9 13,419	50.3 13,261	48.7 12,839
Utah	no index	88.3 6,544	42.4 3,142	38.0 2,816	43.5 3,224	28.6 2,120	43.5 3,224
Virginia	13.2 500	16.0 606	18.2 690	22.2 841	32.2 1,221	40.6 1,539	43.2 1,637
Washington	28.9 1,355	29.0 1,360	32.9 1,542	32.6 1,528	48.4 2,269	42.4 1,988	51.3 2,405
West Virginia	8.6 145	8.6 145	7.0 118	16.0 270	7.7 130	3.4 57	4.2 71

State	1953	1954	1955	1956	1957	1958	1959
Wisconsin	36.8	39.7	42.4	44.2	37.9	34.3	31.6
	1,409	1,521	1,624	1,693	1,452	1,314	1,210
Wyoming	no	5.6	7.5	18.1	30.9	22.7	26.4
	index	460	616	1,486	2,536	1,863	2,167
TOTAL INDEX	*	77,262	85,119	88,372	96,118	89,074	98,667
PERCENTAGE CHANGE		+3.6	+10.2	+3.8	+8.8	-7.3	+10.8

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* The 1953 index is incomplete because Colorado, Utah, and Wyoming did not conduct call-count surveys until 1954. The percentage change from 1953 to 1954 is based on comparable data only.

Table 6. Trends in the Dove Breeding Index*, 1953-59, Summarized by Groups of States and Tentative Management Units.

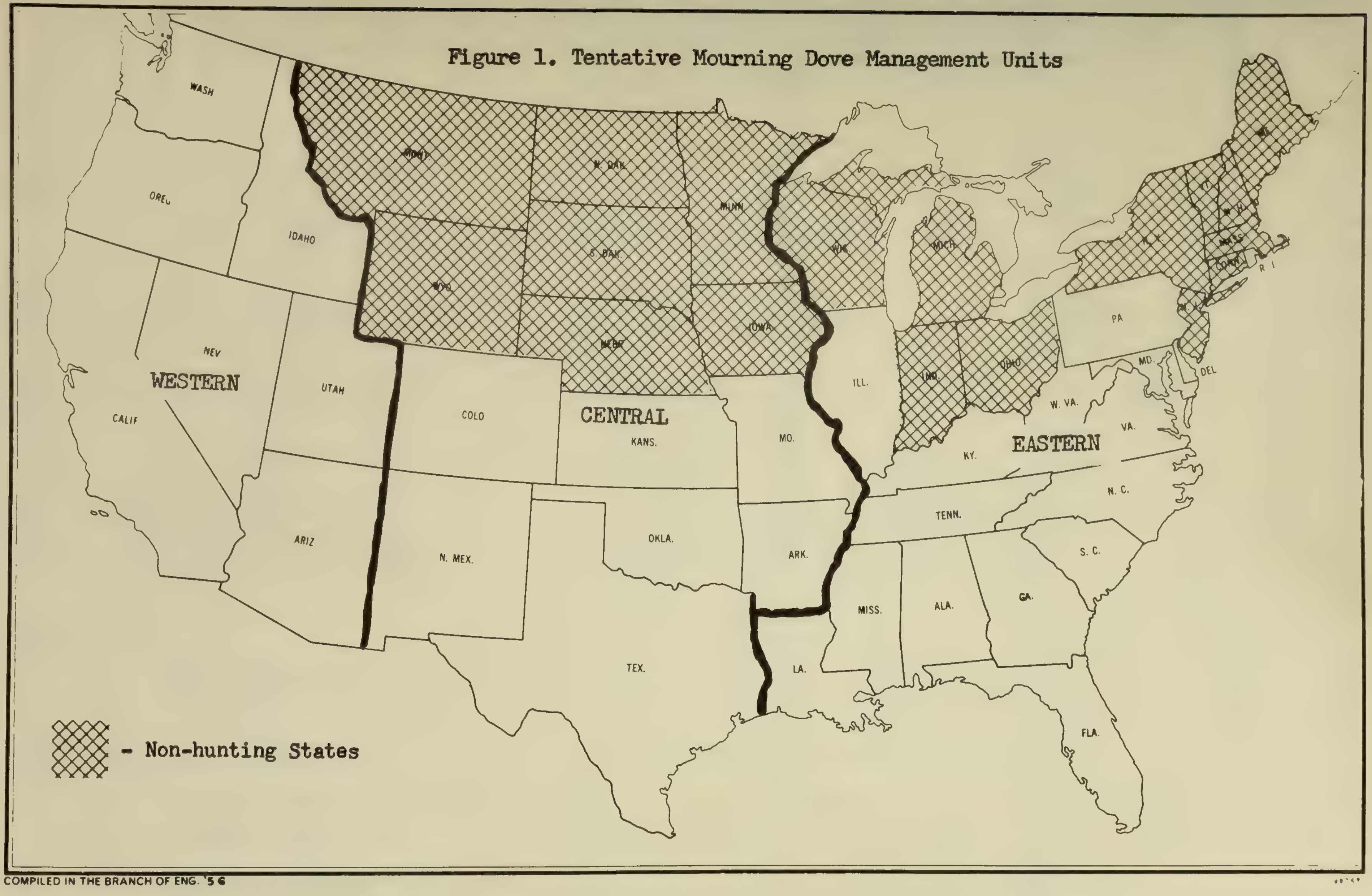
	1953	1954	1955	1956	1957	1958	1959
Groups of States							
Eastern	15,215	17,201	17,670	18,277	19,399	19,814	19,234
Percent Change		+13.1	+2.7	+3.4	+6.1	+2.1	-2.9
Western	*	60,061	67,449	70,095	76,719	69,260	79,433
Percent Change		+1.2	+12.3	+3.9	+9.4	-9.7	+14.7
Tentative Management Units							
Eastern	13,391	15,773	15,983	16,727	17,680	18,037	17,652
Percent Change		+17.8	+1.3	+4.7	+5.7	+2.0	-2.1
Central	*	38,827	50,259	51,391	57,178	52,363	55,802
Percent Change		+3.0	+29.4	+2.3	+11.3	-8.4	+6.2
Western	*	22,663	18,877	20,255	21,259	18,674	25,213
Percent Change		-4.9	-16.7	+7.3	+5.0	-12.2	+25.9

* Indexes in this table are summarized from data in Table 5. The 1953 indexes for Western states and Central and Western management units are incomplete because Colorado, Utah, and Wyoming did not conduct call-count surveys until 1954. Trends from 1953 to 1954 are based on comparable data only.

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

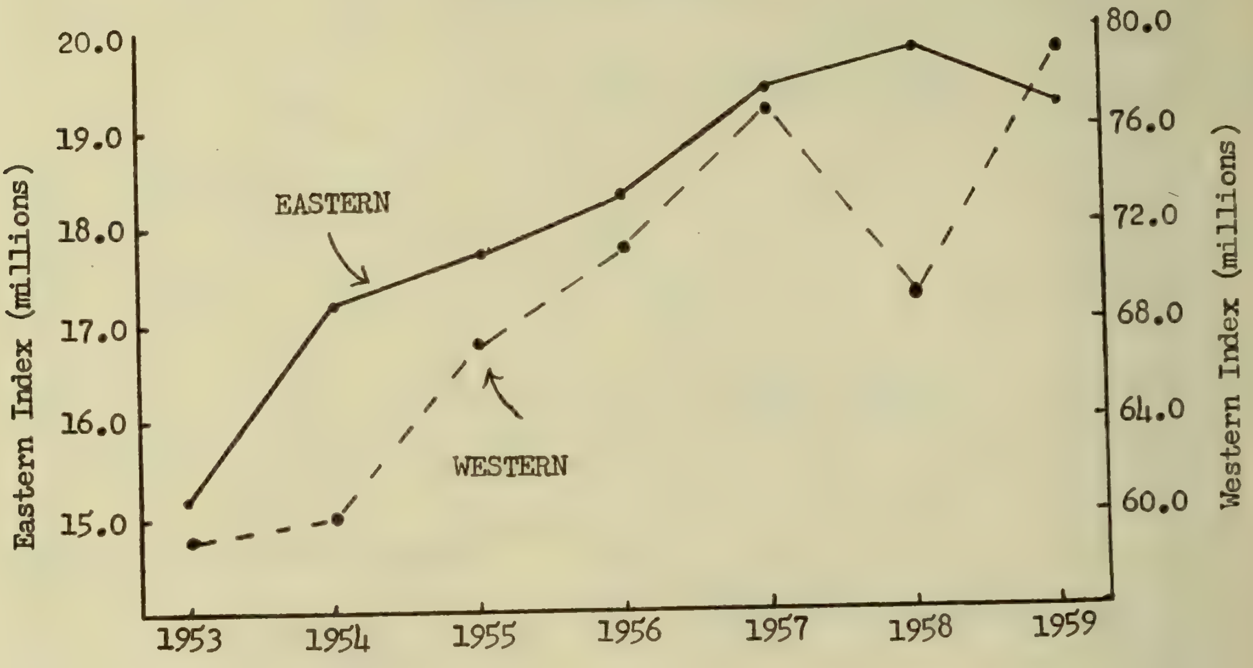
Figure 1. Tentative Mourning Dove Management Units


WESTERN
CENTRAL
EASTERN
WASH
OREG
IDAHO
MONT
WYO
NEV
UTAH
CALIF
ARIZ
COLO
N. MEX.
N. DAK.
S. DAK.
NEBR.
KANS.
OKLA.
TEX.
MINN.
IOWA
MO.
ARK.
LA.
WIS.
ILL.
MICH.
IND.
OHIO
KY.
TENN.
MISS.
ALA.
GA.
FLA.
S. C.
N. C.
VA.
W. VA.
MD.
DEL
PA
N. Y.
N. J.
VT.
N. H.
ME.
MASS.
CONN.
R. I.
▨ - Non-hunting States

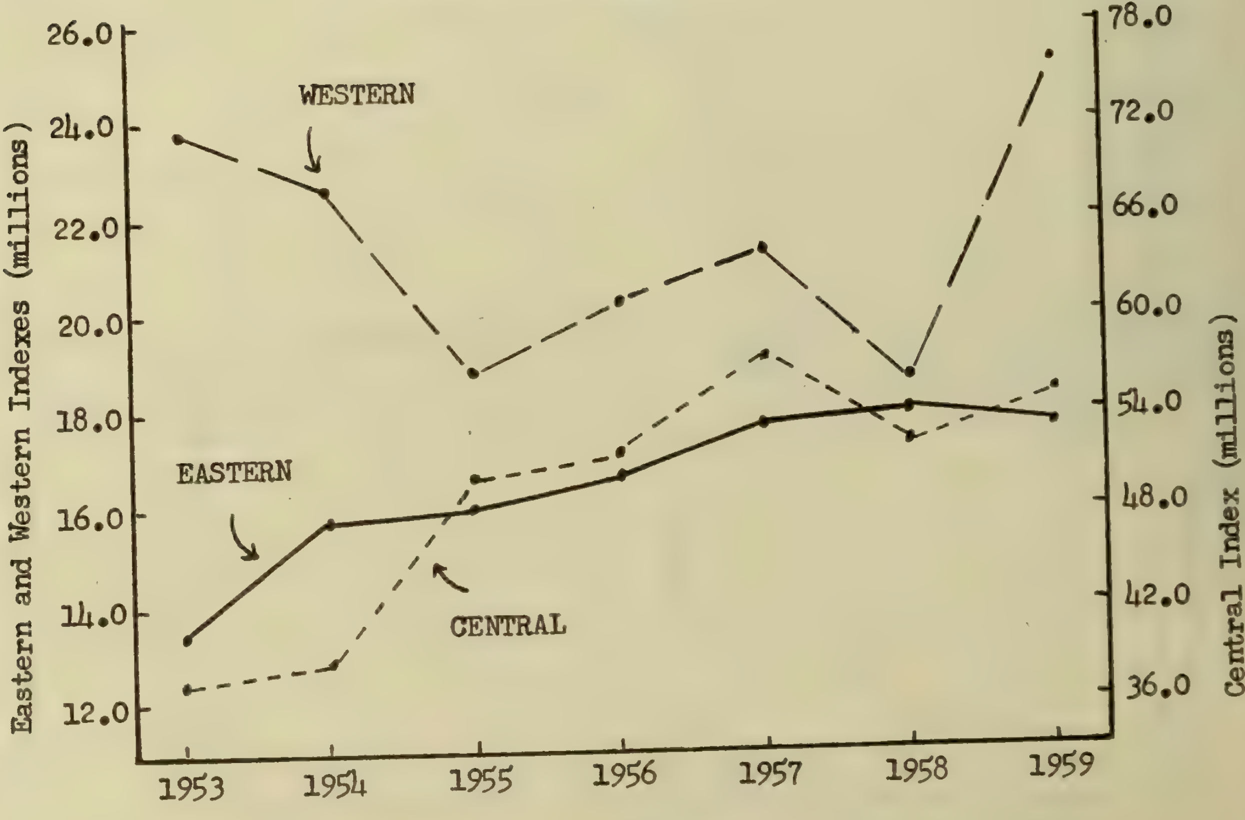
COMPILED IN THE BRANCH OF ENG. '56

Figure 2. Trends in Breeding-population Indexes, 1953-59, for Eastern and Western Groups of States and for Tentative Management Units. (Data are tabulated in Tables 5 and 6.)

Groups of States



Tentative Management Units



Summary of Call-count Routes by States

Includes all routes run in 1959 but only comparable routes for 1958.

ALABAMA

Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959
8R	Colbert-Franklin	19	3	16	12
20R	Morgan-Marshall	29	33	8	22
22R	Cherokee-Etowah	52	33	37	37
23R	Cherokee-Dekalb	48	31	13	33
29R	Etowah	37	23	2	3
34R	Walker	54	20	115	10
43R	Jefferson	21	20	9	12
47R	Claburne-Randolph	19	11	9	16
52R	Shelby-Bibb	7	4	1	0
59R	Hale-Perry	12	13	0	4
63R	Coosa-Elmore	4	12	2	16
69R	Perry-Hale	80	37	36	35
75R	Lee-Macon	7	23	4	4
76R	Lee	6	13	1	3
77R	Choctaw	47	17	17	10
81R	Dallas	18	16	15	17
89R	Wilcox	14	14	5	2
90R	Wilcox-Butler	20	11	3	1
96R	Choctaw-Washington	17	6	3	8
99R	Monroe	5	7	2	6
103R	Pike-Coffee-Barbour	12	15	17	19
105R	Barbour-Henry	22	39	22	17
107R	Clarke	23	34	7	10
116R	Washington-Mobile	3	26	4	18
121R	Covington	26	12	31	18

ARIZONA

1	Graham	42	32	237	7
2	Graham	59	27	42	83
3	Santa Cruz	17	28	11	29
4	Pima	15	26	37	17
5	Maricopa	18	41	334	603
6	Maricopa	30	37	257	380
7	Maricopa	20	87	452	211
8	Maricopa	27	26	8	16
9	Maricopa	11	15	20	27
10	Pima	27	23	40	65
11	Greenlee	40	31	93	263
12	Yavapai	36	44	13	12
13	Coconino	6	0	1	3
14	Yuma	39	57	22	44
15	Mohave	79	52	34	47
16	Maricopa	36	22	149	240
17	Santa Cruz	11	30	15	72
18	Navajo	19	16	13	12
19	Yuma	56	47	85	261
20	Coconino	2	2	4	0
21	Cochise	12	10	12	9

ARKANSAS

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959			1958	1959	1958	1959
1	Arkansas	70	32	180	72	7	Arkansas	24	32	92	41
2	Arkansas	52	64	157	42	8	Montgomery	3	1	8	4
3	Craighead	33	25	224	75	9	Scott	7	0	2	0
4	Craighead	47	48	236	48	10	Marion	24	31	9	12
5	Ouachita	20	15	39	37	11	Madison	35	41	11	13
6	Ouachita	14	10	44	31	12	Van Buren	46	34	15	17

CALIFORNIA

1	Los Angeles	20	14	42	62	13	Los Angeles	40	2	17	34
2	Los Angeles	32	45	42	49	14	Colusa	22	60	24	78
3	Sutter	29	25	27	57	15	San Joaquin	6	57	22	153
4	Butte	76	136	117	123	16	Sacramento	5	11	16	48
5	Humboldt	0	8	4	5	17	Modoc	49	84	10	115
6	Modoc	7	20	27	48	18	Merced	5	13	17	61
7	Tehama-Shasta	35	97	24	84	19	Imperial	116	125	672	734
8	Imperial	81	115	373	875	20	Santa Cruz	25	22	7	30
9	Imperial	58	51	358	167	21	Monterey	102	130	29	54
10	Imperial	51	23	174	103	23	Alameda-Santa Clara	42	56	16	32
11	Riverside	43	38	417	167						
12	Ventura	32	39	35	22	24	Santa Clara	38	44	33	32

COLORADO

7	Adams	0	18	0	32	15	Larimer	55	57	14	25
8	Adams	110	12	63	19	17	Yuma-Washington	26	10	24	7
9	Arapahoe	124	13	88	66	18	Yuma	--	44	0	38
10	Weld	91	22	71	29	19	Garfield	--	51	0	106
11	Moffat	15	16	1	3	20	Mesa	32	65	63	102
13	Larimer-Weld	26	23	13	37	22	Montezuma	4	30	12	11

CONNECTICUT

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959	Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Hartford	10	7	0	2	2	New London	4	5	0	2

DELAWARE

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Kent	30	54	7	14

FLORIDA

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959	Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Dade	11	11	4	37	13	Washington	7	13	10	9
2	Charlotte	29	22	2	0	14	Walton	5	3	2	2
3	Lee	4	9	0	0	15	Sante Rosa	8	9	0	3
5	Polk	13	17	2	3	16	Franklin	2	4	0	0
6	Marion	24	11	0	0	17	Leon	5	11	0	0
7	Levy	12	6	27	12	18	Levy-Marion	13	11	11	17
8	Lafayette	8	14	2	0	19	Levy-Alachua	7	4	10	29
9	Volusia	12	10	0	0	20	Polk	7	12	9	4
10	Columbia	1	3	0	0	21	Orange	30	18	22	14
11	Gadsden-Leon	15	8	4	6	22	Alachua	18	17	2	2
12	Bay	2	12	0	0	23	Alachua	8	4	2	1
						24	Alachua	8	19	3	5

GEORGIA

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959	Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
10R	Gilmer-Pickens	--	15	--	7	47R	Troupe-Chambers, (Ala.)	15	10	8	12
16R	Gordon-Bartow	35	24	16	13	60R	Upson	12	11	8	10
18R	Dawson-Forsyth	11	13	5	3	67R	Screven-Jenkins	10	8	3	8
25R	Cobb-Cherokee	11	10	8	16	79R	Chattahoochee-Stewart	1	4	1	0
27R	Gwinnett-Barrow	18	40	5	10	85R	Laurens-Wheeler	28	25	6	5
28R	Jackson-Barrow	28	25	18	29						
29R	Madison-Oglethorpe	31	38	39	29						

Continued --

GEORGIA - Continued --

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
31R	Haralson-Carroll	15	20	10	3
33R	Walton	26	32	19	29
34R	Oconee	20	28	9	17
38R	Heard	9	13	7	22
90R	Effingham	5	19	1	4
105R	Worth-Turner	12	12	10	10
111R	Wayne	13	19	13	12
118R	Irwin-Berrien	16	14	20	26
121R	Pierce	12	14	5	9
140R	Lowndes	6	17	0	2

IDAHO

1	Bingham	24	23	26	36
2	Power	47	41	23	33
3	Bannock	21	27	60	12
4	Caribou	28	24	27	42
5	Power	11	10	8	78
7	Nez Perce	22	34	90	24
8	Ada-Canyon	30	36	52	52
10	Nez Perce	22	25	54	40
11	Nez Perce	52	43	36	65
14	Jefferson	34	36	26	48
15	Bonneville	32	28	33	125
16	Canyon	36	40	51	40
17	Bear Lake	12	14	14	15
18	Franklin	17	35	4	22
23	Benewah	7	17	6	3

ILLINOIS

1	Cook-Lake	20	8	9	14
2	Lake	20	28	12	14
3	Williamson	44	26	45	46
4	Williamson-Jackson	50	44	32	45
5	Ogle	27	62	31	14
6	Ogle	34	35	21	7
7	Hancock	63	46	60	43
8	Marshall-Putnam	12	14	11	11
9	Fulton-Mc Donough	58	58	33	24
10	Union	34	23	16	27
11	Macon	23	20	24	9
13	Washington	53	65	47	113
14	Lawrence	53	53	73	58
18	Madison-Jersey	31	41	33	45
19	DeKalb	1	5	8	8
20	Mason	22	45	44	32
21	Mason	56	74	44	32
22	St. Clair	30	63	50	37
23	St. Clair	17	17	40	101
24	St. Clair-Monroe	21	15	19	29
25	Lee	10	11	21	15
26	Lee	12	19	9	17
27	St. Clair	76	28	31	81
30	Winnebago	16	8	22	6
32	St. Clair-Madison	31	19	55	33

Continued --

ILLINOIS - Continued --

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959			1958	1959	1958	1959
16	Whiteside	13	4	13	16	33	Tazewell	33	29	29	22
17	Madison	15	8	36	37	34	Knox	45	64	39	23

INDIANA

1	Whitley	34	32	33	15	8	Lawrence-Orange	59	42	76	126
2	Whitley	52	68	8	11	9	Jackson	35	31	67	39
3	Daviess	28	55	66	58	10	Newton	24	14	25	12
4	Daviess	75	96	94	166	11	Newton	30	36	26	24
5	Hendricks	19	15	25	40	12	Wayne	42	32	32	17
6	Hendricks	17	41	41	28	13	Fulton	21	32	14	31
7	Jasper-Pulaski	49	15	18	28	14	Grant	34	32	17	20

IOWA

3	Winnebago	-	46	-	189	13	Chickasaw-Bremer	-	48	-	28
4	Worth	-	51	-	87	14	Clay	-	25	-	42
5	Story	-	8	-	32	15	Linn	-	47	-	40
6	Boone	-	18	-	62	16	Clarke-Decatur	-	71	-	60
9	Polk-Dallas	39	38	44	69	17	Kossuth	77	71	28	28
10	Mills-Fremont	49	177	37	119	18	Franklin	-	12	-	24
11	Lee	44	55	53	34	19	Wapello	-	50	-	30
12	Bremer-Fayette	-	30	-	22	20	Benton	-	19	-	28
						21	Woodbury	-	49	-	65

KANSAS

1	Reno	90	54	80	139	3	Barton	50	41	80	118
2	Sedgwick	47	54	39	140	4	Saline	64	57	69	53

Continued --

KANSAS - Continued --

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
5	Shawnee	57	34	51	42
6	Montgomery	54	54	37	40
7	Cloud	59	79	69	196
8	Marshall	74	55	139	92
9	Lyons	42	52	32	41
10	Crawford	57	34	31	33
11	Barber	79	81	50	151
12	Linn	46	116	59	38
13	Franklin	39	70	48	42
14	Russell	25	47	61	77
15	Barton	41	39	37	79
16	Rush	48	40	47	60
17	Ness	19	53	28	45
18	Finney	18	7	8	20
19	Finney	75	9	74	30
20	Pratt	68	61	99	82
21	Cherokee	-	90	-	145
22	Bourbon	-	56	-	52
23	Atchison	15	194	151	213
24	Sherman	-	12	-	8
25	Morton	7	6	10	26
26	Greeley	-	35	-	9
27	Pottawatomie	57	89	86	69
28	Marion	-	94	-	196
29	Clay	43	26	94	98
30	Smith	35	68	89	61
31	Hodgeman	25	63	11	54
32	Graham	62	70	53	141
33	Ford	34	39	25	65
34	Grant	6	6	6	8
35	Rawlins	64	63	20	42
36	Gove	77	45	124	96
37	Greenwood	27	31	31	73
38	Hamilton	27	62	54	48
39	Meade	18	18	25	62

KENTUCKY

1R	Kenton-Pendleton	45	12	25	4
2R	Trimble-Henry	32	12	28	0
17R	Breckenbridge-Meade	52	32	11	10
20R	Spender-Nelson	25	23	7	16
23R	Bath-Montgomery	34	24	2	5
25R	Lawrence-Johnson	7	11	1	5
27R	Henderson	48	117	55	185
34R	Washington	21	12	1	6
41R	Floyd	7	4	0	0
43R	Crittendon	31	97	66	50
49R	Hart	41	19	18	13
53R	Lincoln-Rockcastle	18	16	5	8
60R	Bullard-McCracken	29	29	54	20
64R	Muhlenburg-Logan	39	14	37	9
79R	Christian	40	41	28	34
82R	Logan-Warren	27	25	17	21
92R	Graves-Weakley,(Tenn.)	41	40	32	37
96R	Bell	2	2	0	0
95R	Whitley-Campbell,(Tenn.)	8	11	0	3

LOUISIANA

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Sabine-Vernin	16	17	9	18
2	Webster	19	20	37	20
3	Acadia	0	1	1	3
5	E. Baton Rouge-Iberville	2	0	1	6
7	E. Feliciana	1	6	3	1
8	Tangipohoa	5	0	2	0
9	Concordia	46	35	16	29
10	Caldwell-Ouachita	12	26	7	5
11	Rapides	5	3	2	2
12	Rapides	8	13	7	4
13	Vernon-Natchitoches	24	8	3	1
14	Natchitoches	19	18	2	2
15	Lafayette	15	22	16	15
16	Vermillion	3	7	7	5
17	Morehouse	57	29	14	4
18	Iberville	13	5	21	6
19	Terrebonne	17	5	19	4
20	Rapides	8	9	20	21
21	Rapides	25	19	45	12
24	Grant	25	37	9	28
25	Vernon	27	17	7	24
26	Lafayette-St. Martin	21	23	18	24
27	Lafayette-St. Martin	4	18	5	30
28	Bienville	28	23	30	20
29	Pointe Coupe	27	19	12	3
30	Union	8	6	9	14
32	Vernon	23	11	8	4

MAINE

1	Kennebec-Lincoln-Sagadahoc	-	2	-	0
2	Kennebec-Sagadahoc	-	1	-	0

MARYLAND

1	Howard	40	41	7	4
2	Prince George	23	18	1	4
3	Washington	13	7	8	12
4	Howard	16	24	9	15
5	Prince George	22	60	13	15
6	Cecil	10	8	4	18
7	Kent	8	9	6	1
8	Queen Anne	14	14	8	5
9	Carolina	21	17	4	7
10	Talbot	11	16	1	3
11	Dorchester	14	13	0	0
12	Wicomico	12	9	2	1

MASSACHUSETTS

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959			1958	1959	1958	1959
1	Essex	6	5	1	2	2	Plymouth-Bristol	5	8	2	1
						3	Bristol	0	3	0	13

MICHIGAN

1	Washtenaw	43	50	44	22	12	Newaygo	-	14	-	3
2	Washtenaw	59	40	33	16	13	Ingham	11	29	5	7
4	Tuscola	12	8	6	5	18	Isabella	12	21	8	13
5	Tuscola	7	5	0	4	20	Isabella	17	43	23	28
6	Monroe	17	35	17	42	22	Isabella	10	13	22	9
9	Bay	15	29	2	3	24	Allegan	48	32	21	30
11	Newaygo	-	24	-	12	25	Calhoun	-	56	-	19

MINNESOTA

1	Jackson	41	16	19	21	10	Dakota	22	27	14	13
2	Jackson	-	9	-	21	11	Ottertail	10	52	12	9
5	Olmsted	18	9	14	47	12	Dodge	55	30	10	17
6	Olmsted	29	16	19	98	15	Pope	-	53	-	11
7	Scott	42	22	55	24	16	Pennington	35	25	47	29
8	Polk-Red Lake	22	29	8	14	17	Roseau	17	1	3	17
9	Beltrami	9	8	3	2	18	Kandiyohi	51	57	33	28

MISSISSIPPI

7R	Tishomingo-Alcorn	27	47	16	26	12R	Union	35	38	22	50
						13R	Prentiss-Lee	41	29	32	40

Continued --

MISSISSIPPI - Continued --

Rt.		Heard		Seen	
No.	County	1958	1959	1958	1959
15R	Cashema-Bolivar	67	26	27	38
22R	Itawamba	22	22	20	22
25R	Tallahatchie	51	30	104	47
28R	Chickasaw	35	22	23	19
33R	Sunflower-LeFlore	42	30	47	45
35R	Montgomery	43	35	57	49
43R	Carroll-Hdmes	67	68	72	88
50R	Holmes-Yazoo	71	68	69	92
56R	Sharkey-Issaquena	21	24	25	30

Rt.		Heard		Seen	
No.	County	1958	1959	1958	1959
60R	Leake	10	33	21	65
73R	Rankin	7	12	22	43
74R	Smith	18	14	14	63
78R	Jefferson	23	9	7	10
89R	Lincoln	16	15	26	19
94R	Wayne	14	3	7	3
95R	Wayne	22	7	13	9
101R	Lamar-Marion	23	17	34	13
113R	Hancock	6	2	20	7
115R	Jackson	16	2	41	2

MISSOURI

1	Boone	71	78	68	103
2	Boone-Callaway	122	71	51	65
3	Callaway	75	59	57	122
4	Cole	59	42	57	76
5	Cape Girardeau	38	47	39	45
6	Cape Girardeau	-	57	-	30
7	Howell-Douglas	35	15	11	5
8	Texas	23	19	8	16
9	Greene	27	29	33	48
10	Greene	17	20	124	45

11	St. Charles	39	22	45	11
13	DeKalb-Daviess	74	59	60	27
14	Daviess-Caldwell	79	67	65	48
15	Lawrence	25	24	101	91
16	Lawrence	27	31	105	111
17	Marion	59	86	77	73
18	Marion	69	64	111	46
19	Chariton	104	83	171	87
21	St. Charles	20	32	32	26
22	St. Charles	-	68	-	39
23	Greene	-	46	-	98

MONTANA

1	Yellowstone	28	23	10	14
2	Lewis-Clark	22	6	18	4
8	Phillips	123	64	13	18
9	Phillips	156	158	21	17
10	Phillips	10	25	18	7

14	Madison	21	22	17	21
15	Ravelli	0	0	27	61
17	Lincoln	0	11	2	2
19	Dawson	18	15	57	30
20	Powder River	72	90	21	3

Continued --

MONTANA - Continued --

Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959
28	Pondera-Toole	3	4	4	1
29	Madison-Beaverhead	14	15	31	38
33	Hill	-	27	-	159
38	Musselshell	65	83	7	9
39	Big Horn	114	142	101	419
44	Broadwater	-	11	-	17

NEBRASKA

1	Lancaster	-	117	-	128
2	Lancaster	-	75	-	81
3	Adams	15	58	82	103
4	Adams	14	72	62	124
5	Hamilton	37	12	76	44
11	Platte	34	43	32	65
12	Lincoln	20	66	83	144

NEVADA

1	Churchill	32	46	16	24
2	Clark	37	100	77	73
3	Clark-Mohave	19	98	8	203
4	Clark	24	24	21	103
5	Clark	20	0	46	2
6	Elko-White Pine	36	47	0	1
7	Elko	18	19	35	69
8	Lyon	6	46	1	47
12	Pershing	6	46	18	122
13	Clark	0	0	27	0
14	Clark	0	1	0	4
15	Elko	33	10	0	0
16	Washoe	18	50	1	37
17	Lincoln	-	0	-	2
21	Lander	3	3	0	20
22	Lander	5	0	0	2
23	Elko	5	6	4	30
24	Lander	0	0	0	2
26	Eureka	22	31	1	3
27	Nye	2	0	0	0

NEW HAMPSHIRE

2	Merrimac-Rockingham	-	4	-	0
4	Strafford	-	4	-	0
5	Strafford-Rockingham	-	1	-	1

NEW JERSEY

Rt. No.	County	Heard		Seen		Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959			1958	1959	1958	1959
1	Sussex	5	6	4	5	7	Salem	39	26	3	3
2	Sussex	2	8	0	8	9	Ocean	16	15	5	3
4	Hunterdon	9	15	15	16	10	Hunterdon	23	34	12	53
5	Cumberland	2	9	7	5	11	Somerset	58	66	19	23

NEW MEXICO

1	Bernalillo-Valencia	-	17	-	85	17	Valencia-Socorro	-	54	-	191
2	Bernalillo-Sandoval-Santa Fe	-	37	-	7	18	Valencia	-	9	-	23
5	Dona Ana	16	9	38	55	19	Chaves	20	51	29	39
6	Grant	-	13	-	16	22	Union	-	14	-	7
7	Grant-Hidalgo	-	40	-	51	23	Union	-	3	-	29
10	Chaves	50	20	53	78	24	Roosevelt	-	21	-	11
12	Chaves	103	53	27	39	25	Roosevelt	4	17	5	13
14	Rio Arriba	18	87	0	14	29	Roosevelt	4	33	18	19
						31	Socorro	45	70	35	34

NEW YORK

1	Niagara	55	60	10	21	7	Suffolk	18	20	1	1
2	Niagara	64	33	8	16	13	Wayne	23	5	3	2
3	Orleans-Genessee	45	33	9	5	14	Ulster	22	18	2	2
5	Seneca	11	3	5	2	16	Columbia	-	5	-	10
6	Seneca	2	7	6	1	17	Dutchess	-	27	-	2

NORTH CAROLINA

16R	Hertford-Gates	24	60	4	90	22R	Surry-Yadkin	28	13	36	9

Continued --

NORTH CAROLINA - Continued --

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
24R	Guilford-Caswell-Alamance	19	13	18	19
26R	Durham-Person	7	11	5	3
36R	Wilkes-Caldwell	16	4	2	2
52R	Madison-Buncombe	4	2	2	2
54R	Burke	3	20	2	24
58R	Davidson	31	21	16	2
60R	Randolph-Chatham	21	36	19	19
63R	Wake-Johnson	28	41	12	65
65R	Wilson-Greene	46	74	16	19
70R	Macon	2	2	1	2
77R	Macklinburg-Cabarrus	25	22	35	28
80R	Montgomery-Moore	26	18	15	9
85R	Wayne-Duplin	70	77	43	32
92R	Jackson	2	3	1	4
96R	Richmond-Montgomery	31	25	9	2
98R	Hope	32	45	16	8
99R	Cumberland	22	40	14	5
101R	Sampson	18	28	20	38
112R	Onslow	20	31	25	33

NORTH DAKOTA

1	Burleigh	37	25	22	36
2	Burleigh	73	62	26	42
3	McHenry-Bottineau	19	38	17	20
4	Sheridan	-	8	-	10
5	Stutsman	18	42	11	30
7	McHenry	28	39	41	23
8	Ward-Renville	68	49	4	8
9	Ward	58	80	8	13
12	Ward	-	13	-	5
13	Ward	4	22	6	4
16	Williams	7	8	1	7
17	Williams	5	4	6	7
18	Walsh-Pembina	34	43	24	14
19	Walsh	-	25	-	41
20	Sargent	95	84	31	45
21	Ward	4	6	1	8
22	Mountrail	8	4	9	6
23	Starke	30	12	13	27
24	Golden Valley	9	6	13	11
25	Kidder	18	35	14	11
26	McLean	16	20	27	16

OHIO

1	Ottawa	15	28	19	30
2	Franklin	-	15	-	23
3	Franklin	21	17	16	13
9	Franklin	13	8	17	4
10	Pickaway & Ross	56	28	19	65
12	Wood	24	28	26	44
13	Wood	31	26	12	13
14	Wood	26	14	16	8
15	Wood	25	28	13	32
17	Union	-	38	-	17
18	Highland	-	34	-	8
19	Union	-	31	-	9
20	Delaware	-	30	-	9
21	Delaware & Union	-	19	-	34

OKLAHOMA

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Oklahoma-Canadian	55	32	16	26
2	Tulsa-Rogers	15	18	56	17
3	Pittsburg-Latimer	20	18	36	14
4	Wagoner	16	13	35	52
5	Major	58	51	81	58
6	Comanche	33	29	4	42
7	Caddo	27	24	52	61
8	Cotton	--	41	--	59
9	McIntosh	24	17	37	27
10	Kingfisher	52	50	54	53
12	Grady	29	50	13	13
13	Muskogee	21	8	17	14
14	Greer	--	50	--	149
15	Love	236	154	55	34
16	Johnston	87	90	72	100
17	Woodward	93	204	107	133

OREGON

1	Umatilla	31	19	24	59
2	Jackson	15	29	39	170
3	Umatilla	47	55	41	54
4	Yamhill-Polk	10	45	24	36
5	Klamath	58	106	5	22
6	Deschutes	18	30	9	15
8	Linn	11	6	6	48
11	Morrow	38	71	111	140
12	Grant	54	61	42	37
13	Baker	9	11	19	41
14	Harney	24	21	24	0
15	Malheur	3	13	18	27
16	Lake	--	3	--	9

PENNSYLVANIA

2	Centre	7	1	0	1
3	Centre	1	6	1	1
5	Elk	2	1	0	0
6	Elk-Jefferson	0	3	1	0
8	Lycoming-Clinton	1	1	3	8
10	Franklin	45	38	5	0
13	York	24	24	21	15
14	Perry	15	28	1	2
15	Perry	6	12	9	0
16	Indiana	8	3	2	9
17	Indiana	19	11	3	0
18	Franklin	55	70	4	22
20	Lancaster	16	19	16	29

RHODE ISLAND

1	Providence-Kent	--	11	--	3
2	Washington	--	17	--	0

SOUTH CAROLINA

Rt. No.	County	Heard		Seen	
		1958	1959	1958	1959
4R	Cherokee-Cleveland (N.C.)	58	42	112	87
6R	Oconee-Rabun(Ga.)	8	11	0	0
10R	Union-Chester	33	32	7	14
14R	Chesterfield	86	72	29	15
18R	Laurens	27	39	20	71
25R	Marlboro	58	61	173	33
27R	Abbeville	35	31	13	33
32R	Kershaw-Richland	14	25	4	34
47R	Horry	53	52	19	8
48R	Edgefield	14	11	2	5
50R	Aiken	60	62	60	39
51R	Orangeburg-Aiken	20	20	10	9
53R	Clarendon	28	23	13	8
54R	Clarendon-Williamsburg	19	26	0	8
59R	Orangeburg	29	25	8	6
60R	Orangeburg	11	3	31	47
70R	Barkley-Charleston	5	7	0	0
71R	Hampton-Jasper	41	29	3	4
73R	Charleston-Dorchester	1	2	1	0

SOUTH DAKOTA

1	Brown	43	37	35	37
2	Brown	44	58	63	45
3	Hanson-Davison	83	64	35	56
4	Aurora	46	24	16	25
7	Corson	23	44	9	18
8	Hughes	63	40	24	49
9	Kingsbury	65	56	15	30
10	Lyman	48	54	34	58

TENNESSEE

6R	Macon-Allen(Ky)	36	24	45	44
7R	Clay-Jackson	13	29	6	19
9R	Peckett-Wayne(Ky)	43	22	24	17
10R	Scott-McCreary (Ky)	1	7	0	2
14R	Dryer	45	43	18	15
20R	Dickson	40	26	48	17
23R	Smith	66	39	44	28
24R	Jackson	27	18	16	10
29R	Union-Claiborne	36	25	11	14
31R	Hawkins-Green	37	14	36	38
36R	Gibson	29	61	39	77
38R	Benton	38	44	35	28
44R	DeKalb-Cannon	25	16	21	21
47R	Morgan-Cumberland	9	19	6	4
53R	Landerdale	15	20	40	67
55R	Crockett-Haywood	38	24	34	20
57R	Henderson	71	54	26	45
61R	Maury	38	15	46	14
63R	Rutherford	54	45	29	16
71R	Sevier	5	6	2	0
75R	Hardeman-Madison	39	13	29	9
84R	Grundy-Sequatchee	6	2	2	2
89R	Shelby	21	49	9	67

TEXAS

Rt. No.	County	1958	1959	1958	1959
1	Wise	--	25	--	31
3	Robertson	47	34	51	90
4	Robertson	45	30	27	46
7	Bosque	106	112	103	128
8	Bosque	117	142	58	73
9	Wilson	195	229	85	182
10	Wilson	212	227	121	104
11	Victoria	--	2	--	44
12	Harris	--	66	--	88
13	Brazoria	70	58	102	209
15	Chambers	16	5	72	56
16	Travis	13	39	10	45
17	Titus	--	70	--	38
18	Kleberg	74	79	115	205
19	Crockett	37	37	94	24
20	Crickett	24	27	107	28
21	Val Verde	3	5	114	52
22	Val Verde	15	27	248	110
23	Throckmorton	96	61	250	159
24	Throckmorton	97	43	237	170
25	Lubbock	0	0	6	7
26	Lubbock	7	5	10	8
27	Webb	17	78	125	185
28	Jefferson	35	22	50	73
29	Bexar	58	56	55	49
30	Nolan	57	10	84	71

Rt. No.	County	1958	1959	1958	1959
31	Wise	--	74	--	67
34	Hemphill	59	42	131	87
35	Hemphill	3	20	107	91
38	Potter	--	57	--	141
39	Potter	--	102	--	216
42	Jefferson	8	16	93	87
43	Roberts	69	55	69	47
44	Roberts	67	26	74	25
45	Tom Green	--	88	--	171
46	Tom Green	--	95	--	188
47	Willacy	103	76	68	32
48	Cameron	42	57	180	261
49	Dewitt	71	73	143	226
50	Bee	33	30	213	243
51	Colorado	62	43	180	243
52	Hudspeth	8	6	2	0
54	Reeves	58	44	55	52
55	Tarrant	13	8	30	19
56	Midland-Glasscock	--	22	--	63
58	Brown	79	131	143	150
62	La Salle	--	63	--	187
63	Lamar	25	23	150	166
64	Smith	15	17	48	23
65	Hopkins	15	10	172	81

UTAH

2	Cache	2	9	1	8
4	Tooele	29	27	90	138
5	Juab-Tooele	--	26	--	5
8	San Juan	2	20	52	82
9	Carbon-Emery	13	28	3	19
11	Kane	--	55	--	57
12	Iron	25	60	20	105
14	Millard	46	99	22	89
15	Salt Lake	8	27	15	34
16	Juab	47	48	15	20
17	Juab-Millard	41	55	82	120

19	Garfield	13	26	21	11
20	Garfield-Wayne	--	4	--	3
21	Sanpete	--	100	--	55
22	Beaver	--	191	--	70
25	Uintah	--	36	--	4
26	Wayne-Emery	5	3	5	0
27	Weber	11	15	23	24
29	Summit	1	2	0	3
30	Juab	14	56	42	61
31	Summit	47	44	1	5
32	Uintah	51	22	41	19

VERMONT

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959	Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Addison	--	1	--	4						

VIRGINIA

1	Alexandria-Fairfax	20	15	10	10	6	Nansemond-Isle of Wight	39	46	29	9
2	Fairfax	18	35	7	9	7	Campbell	39	44	8	11
3	Westmoreland-Richmond	56	66	44	80	8	Southampton	82	72	31	22
5	Nansemond-Isle of Wight	59	57	27	24	11	Montgomery	8	5	1	0
						12	Accomack	25	18	4	1
						13	Culpepper	53	66	4	22

WASHINGTON

1	Spokane	107	76	23	23	12	Yakima	42	38	86	139
2	Douglas	42	48	55	61	13	Ferry	52	58	16	19
4	Whitman	71	121	40	13	14	Stevens	68	121	25	32
6	Okanogan	55	56	270	175	17	Douglas	50	52	100	215
7	Skagit	2	4	3	7	18	Chelan	20	33	108	97
8	Yakima	81	121	211	229	19	Okanogan	56	68	125	126
9	Yakima	51	47	235	376	20	Okanogan	22	37	102	34
10	Yakima	28	24	80	101						

WEST VIRGINIA

1	Hampshire	4	5	4	1

WISCONSIN

Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959	Rt. No.	County	Heard 1958	Heard 1959	Seen 1958	Seen 1959
1	Dane-Columbia	39	36	21	19	9	Sauk	26	40	4	3
2	Columbia	29	24	14	5	10	Waushara	47	34	9	19
3	Iowa	29	27	4	2	11	Columbia	27	23	11	3
4	Green	35	38	17	12	12	Dane	19	18	18	8
5	Jackson	--	70	--	12	13	Adams	15	28	4	1
6	Dunn	82	71	9	23	17	Winnebago	10	7	1	4
7	Dunn	43	49	14	14	18	Winnebago	10	14	3	4
8	Adams	58	36	9	8	19	Kenosha	41	25	10	10

WYOMING

1	Johnson	1	20	11	11	13	Niobrara	72	66	24	45
2	Hot Springs	--	4	--	14	14	Bighorn	30	40	89	9
3	Natrona	39	45	19	25	15	Lincoln	--	0	--	0
4	Carbon	13	11	8	3	16	Campbell	40	64	93	179
5	Fremont	13	19	55	6	17	Sweetwater	6	0	0	0
6	Park	14	17	26	12	18	Fremont	34	24	43	70
7	Platte	14	21	14	15	19	Albany	2	0	2	0
8	Washakie	19	28	31	17	21	Laramie	19	16	20	39
9	Crook	9	7	1	15	22	Johnson	--	24	--	5
11	Converse	66	75	37	381	23	Park	1	0	7	3
12	Uinta	5	5	6	8	24	Lincoln	2	8	1	2
						25	Sublette	1	0	0	0

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MOURNING DOVE NEWSLETTER 1960

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UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

United States Department of the Interior, Fred A. Seaton, Secretary
U. S. Fish and Wildlife Service, Arnie J. Suomela, Commissioner

MOURNING DOVE NEWSLETTER - 1960

Compiled by

William H. Kiel, Jr.
Branch of Wildlife Research
Bureau of Sport Fisheries and Wildlife

Washington - July 1960

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ABSTRACT

Activities of the States, Bureau, and Cooperative Wildlife Research Units in mourning-dove management and research are described. Most effort is being directed to projects concerning the call-count survey, banding, hunting-kill statistics, and habitat improvement.

The thirty hunting States are devoting an average of 0.6 man-year annually to dove projects. Eighteen non-hunting States allot an average of 0.3 man-year annually to similar projects. The national average is 0.5 man-year per State annually, a total of 24.6 man-years.

The Bureau spends approximately seven man-years annually on dove projects. Five Cooperative Wildlife Research Units have active dove-research projects or are planning them.

A national program of research and management is being developed as a cooperative plan of the International Association of Game, Fish and Conservation Commissioners and the Bureau.

Mourning dove diseases -- trichomoniasis, pox, coccidiosis, blood protozoan infections, salmonellosis, and viral diseases -- are described and suggestions for diagnostic procedures are given.

COVER: The mourning dove painting by Orville Rice was reproduced with the permission of the Texas Game and Fish Commission, Austin.

INTRODUCTION

The primary purpose of this newsletter is to unite, through a medium of common interest, the widely scattered personnel who are engaged in research and management projects on mourning doves. There has been a demand for a newsletter that reports *who* is doing *what* and *where*. Personnel of many States believe they will benefit by contact with others working in the same field.

The first *Mourning Dove Newsletter* was issued in February 1949, and Issue Number 14 was released in June 1959. During the 1949-54 period, the *Mourning Dove Newsletter* was compiled in the Atlanta Regional Office of the U. S. Fish and Wildlife Service. Issues contained information on activities in dove management and research, in addition to statistics on the status of the dove population. Beginning in 1955, the *Newsletter* was prepared in the Washington Office of the Fish and Wildlife Service and was essentially a report on the status of the population. In 1960, the information on the status of the dove population was summarized and published as *Mourning Dove Status Report-1960*

The *Mourning Dove Newsletter* will report activities that are not included in the annual *Mourning Dove Status Report* (which is compiled in June primarily for use during discussions of hunting regulations).

This issue is based largely on information supplied by the States in response to a questionnaire sent in January 1960 from the Bureau of Sport Fisheries and Wildlife.

ACTIVITIES OF THE STATES IN MOURNING-DOVE MANAGEMENT AND RESEARCH

Abstracts of responses to the 1960 mourning-dove questionnaire are presented in this section and summarized in Table 1. State responses are reported here as nearly as possible in the sense of the response, without attempted appraisal or comparison. When a State did not estimate annual man-years devoted to dove projects, the compiler inserted an estimate based on the other information provided by the State.

Subjects on which States provided information are listed below in the form in which they were presented in the questionnaire.

1. Dove-contact address. Please list the name and address of the person in charge of dove studies who will be the source for future information on doves in your State.

2. Game-bird versus song-bird controversy. Has your State ever been involved in this controversy over the status of the mourning dove? If so: (a) When was the status of the dove questioned and was the dove removed from or placed on the game-bird list? (b) What was the nature of the opposition to shooting doves--local bird clubs, farmer's groups, etc.? (c) Comment on the present status of any campaign designed to change the status of the dove in your State.

3. Trapping and banding techniques. (a) How are adult and immature doves trapped--type of traps or net, bait used, etc.? If the trap is of a design not commonly used, please describe it briefly or diagram its construction. (b) In nestling banding, have you used special techniques to hold bands on the legs of very small nestlings? If so, please describe the procedure and give your evaluation of its effectiveness.

4. Studies in progress. (a) Excluding the call-count survey, list the types of studies being conducted. Examples--production, road counts, banding, kill statistics, habitat improvement, managed hunting areas, etc. Please include studies being made in your State by graduate students, if known. (b) The State employs how many men full-time on dove projects, excluding law enforcement? How many part-time? If possible, please estimate the man-years or fraction thereof devoted annually to dove investigations and management.

5. Hunting-kill statistics. (a) If a survey is conducted, please specify type--license stubs, field bag checks, etc. (b) List estimates of hunting kill, excluding crippling loss, for 1958 and for earlier years if statistics are available from surveys.

HUNTING STATES

ALABAMA

Dove-contact address

James E. Keeler, Biologist, Alabama Department of Conservation, Montgomery 4.

Game-bird versus song-bird controversy

The State has never been involved in a controversy over the game-bird or song-bird status of the mourning dove.

Trapping and banding techniques

Adults and immatures--Doves are trapped in quail traps with two funnels. Scratch grain is the bait most commonly used. Some doves have been caught recently with the Japanese mist net, a method that may prove to be highly successful in certain instances.
Nestlings--No special techniques have been tried to hold bands on nestling doves. If nestlings are too small to retain bands when first found, a return visit is made to the nest at a later date.

Studies in progress

Types--Call-count survey, random roadside counts, hunting-kill index, and banding.
Personnel employed--The State employs no full-time biologist on the dove project. A total of 32 men work part time on this project or the equivalent of 2.8 man-years annually on dove investigations.

Hunting-kill statistics

An index to hunting kill is obtained by conducting field bag checks.

ARIZONA

Dove-contact address

John L. Stair, Small Game Supervisor, Arizona Game and Fish Department, Arizona State Office Building, Phoenix.

Game-bird versus song-bird controversy

No organized opposition has been offered in the last 10 years to dove hunting.

Trapping and banding techniques

Adults and immatures--Trapping is concentrated in feedlots and stubble fields. The most successful traps are Stoddard collapsible quail traps equipped with funnel entrances and baited with waste grain of the kind being used by the doves. Experiments are underway on a mirror-type entrance for bait traps.
Nestlings--Standard techniques are used.

Studies in progress

Types--Call-count survey, hunting information obtained by bag checks and collection of wings, banding, nesting-habitat evaluation, effects of diseases and pesticides on doves (Arizona State University).
Personnel employed--One small-game biologist spends three-fourths of his time on doves. Two to four assistants are employed to work part time during the summer and hunting season. In the aggregate, approximately 1.5 man-years are devoted to dove projects annually.

Hunting-kill statistics

An estimate of hunting kill is obtained through hunter bag checks and a mail questionnaire sent to a randomly selected list of hunting-license purchasers. The estimate for 1958 was 867,000 mourning doves bagged.

ARKANSAS

Dove-contact address

Gene Rush, Chief, Game Division, Arkansas Game and Fish Commission,
State Capitol Grounds, Little Rock.

Game-bird versus song-bird controversy

Arkansas has not been involved in this question.

Trapping and banding techniques

Standard techniques are used.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--An estimated 0.1 man-year is allotted to dove projects.

Hunting-kill statistics

No estimates are made.

CALIFORNIA

Dove-contact address

Donald D. McLean, Project Leader, Upland Game Investigations,
California Department of Fish and Game, 722 Capitol Avenue,
Sacramento.

Game-bird versus song-bird controversy

A very active and well organized group known as the Committee for Dove Protection is attempting to have the mourning dove placed in the song-bird category. The group became active in 1954. Women's clubs, garden clubs, some bird clubs, and similar groups are most active in pressing for complete dove protection under the committee's direction.

Trapping and banding techniques

Adults and immatures--Clover-leaf traps, quail-type funnel traps, cannon nets, and mist nets are used. Large numbers of doves have been banded by placing traps over isolated watering sites, particularly in arid regions. For bait trapping, chick scratch, wheat, gyp corn, watergrass seed, pigweed seed, and cracked rice are used.

Nestlings--Bands have been held on very small nestlings by the use of plastic adhesive tape, which deteriorated rather quickly with age and exposure. The value of this method is questioned by the department because some bands were found in nests after the young fledged. Banders normally visit the study areas at regular intervals and avoid banding very small nestlings.

Studies in progress

Types--The State has completed the major part of its dove-study project and is planning to publish the results. The project included studies of distribution, migration, production, trend counts, banding, kill statistics, food habits, general habits, diseases, revision of age-classing techniques, habitat improvement, population shifts, and related subjects.

Personnel employed--From 1956 through 1959, an average of more than 3 man-years annually was spent on doves. Seasonal assistants are used. At present, no one is working full-time on the dove study.

Hunting-kill statistics

Questionnaires are mailed annually to about two per cent of the license holders. Hunter bag checks are conducted in most major dove-hunting areas to determine hunter effort, success, and adult-immature ratios. Based on questionnaires returned, the 1958 hunting kill was 3,399,000 doves. The department feels that this estimate is too high because of response and memory biases and other factors. One-half the indicated kill has been used as a conservative estimate by the State.

COLORADO

Dove-contact address

Wayne W. Sandfort, Principal Game Biologist, Colorado Department of Game and Fish, Petroleum Building, Grand Junction.

Game-bird versus song-bird controversy

There has been no known controversy within the State other than a few individual comments.

Trapping and banding techniques

Adults and immatures--Traps used are constructed of 1-inch mesh wire, 2-feet high, and supported with stakes made of 3/8-inch concrete reinforcing bars. Wheat is used as bait.
Nestlings--Nestlings are not banded before they are large enough to hold bands satisfactorily--usually about 7 days of age.

Studies in progress

Types--Call-count survey, kill statistics.
Personnel employed--No person is assigned particularly to a dove project. About 0.1 man-year annually is spent in dove work.

Hunting-kill statistics

Kill statistics are compiled from reports by small-game license holders. A random sample survey is conducted by mail in which estimates are obtained for waterfowl, doves and other upland game birds, and rabbits. The estimated dove hunting kill in 1958 was 152,000.

DELAWARE

Dove contact address

Dr. Jay L. Harmic, Chief, Game and Fish Management, Delaware Board of Game and Fish Commissioners, Dover.

Game-bird versus song-bird controversy

For the past 10 years there has been only very slight opposition to classifying the dove as a game bird. Hunting for doves has no doubt been increasing each year.

Trapping and banding techniques

Only nestling banding has been done.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--An estimated 0.1 man-year annually is allotted to dove projects.

Hunting-kill statistics

No estimates are made.

FLORIDA

Dove-contact address

Frank Winston, Biologist, Florida Game and Fresh Water Fish Commission, 346 Tanager Court, Lakeland.

Game-bird versus song-bird controversy

There have been some comments about closing the hunting season in the Miami area.

Trapping and banding techniques

Adults and immatures--A permanent banding station operating throughout the year is maintained at West Palm Beach. Doves are banded also at Alligator Point, Franklin County, in October. Quail-type funnel traps are used with scratch grain for bait.
Nestlings--No banding.

Studies in progress

Types--Call-count survey, hunting-kill survey, banding.
Personnel employed--One biologist is assigned 1/4-time to dove projects. Including trapping and banding and time spent on the kill survey, approximately 1 man-year annually is spent on doves.

Hunting-kill statistics

The method employed is a post-season hunter questionnaire. Estimated hunting kill for 1958 was not available, but estimates for 1957 and 1956 were over 1,900,000 doves bagged annually.

GEORGIA

Dove-contact address

George C. Moore, Chief, Game Management Division, Georgia Game and Fish Commission, 401 State Capitol, Atlanta 3.

Game-bird versus song-bird controversy

There has been no controversy over the status of the dove in Georgia.

Trapping and banding techniques

Adults and immatures--One trapping station near the coast will be in continuous operation. Traps are of the clover-leaf design.
Nestlings--No nestling banding is being done.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--Approximately 0.1 man-year annually is devoted to dove projects.

Hunting-kill statistics

No estimates are made at the present time.

IDAHO

Dove-contact address

Charles D. Haynes, Biologist, Idaho Department of Fish and Game,
518 Front Street, Boise.

Game-bird versus song-bird controversy

The status of the dove has been questioned since hunting seasons were opened. Opposition to hunting is largely from garden clubs and individuals who regard the dove as a songbird. There is a continuous campaign to close the hunting season on doves through legislative action.

Trapping and banding techniques

Adults and immatures--Funnel-type traps baited with wheat are used.

Nestlings--Elastic tape is used to hold bands on nestlings. No evaluation of the effectiveness of this technique has been made.

Studies in progress

Types--Call-count survey, production, road counts, banding, kill statistics.

Personnel employed--No one is employed full time on doves. Four biologists devote a portion of their time to dove projects, and, in the aggregate, approximately 0.8 man-year annually is allotted to dove work.

Hunting-kill statistics

A trend in hunting kill is obtained from an annual questionnaire to hunters. Five per cent of the license buyers are sampled. The 1958 estimate was 144,000 doves killed. Field bag checks are made in certain harvest areas.

ILLINOIS

Dove-contact address

William E. Cloe, Assistant Superintendent, Game Management
Division, Illinois Department of Conservation, 102 State
Office Building, Springfield.

Game-bird versus song-bird controversy

The State is involved in the controversy over the status of the mourning dove. Every two years a bill is introduced in the State legislature to have the dove put on the song-bird list. Opposition to hunting doves is not strong and comes mostly from local bird clubs.

Trapping and banding techniques

Adults and immatures--A cannon-projected net has been used over areas baited with wheat.

Studies in progress

Types--Call-count survey, kill statistics, banding.
Personnel employed--No biologist is employed full time on the dove project. Approximately 0.3 man-year is spent on dove investigations.

Hunting-kill statistics

About 2.4 per cent of the licensed hunters are reached by a mail survey. Based on reported kill, 1,338,000 doves were taken in 1958. Limited field bag checks are made.

KANSAS

Dove-contact address

David C. Coleman, Game Biologist, Kansas Forestry, Fish and Game Commission, Pratt.

Game-bird versus song-bird controversy

In 1955 and 1959, bills were introduced in the State legislature to prohibit dove hunting. Both attempts failed. Opposition to dove hunting came from bird clubs, garden clubs, and a few farm groups.

Trapping and banding techniques

Nestlings--Elastic adhesive tape has been used with moderate success in banding nestlings.

Studies in progress

Types--Call-count survey, banding, hunting kill.
Personnel employed--No biologist is working full time on dove projects. An estimated 0.2 man-year is spent annually on dove investigations and management.

Hunting-kill statistics

A mail-questionnaire survey based on a random sample of names from license stubs is used. The estimated kill of doves in 1958 was 1,197,000.

KENTUCKY

Dove-contact address

Dan M. Russell, Dove Study Leader, Kentucky Department of
Fish and Wildlife Resources, 707 Josephine, Bowling Green.

Game-bird versus song-bird controversy

A bill was introduced in the current session of the legislature to place the dove on the song-bird list in Kentucky. Controversy over the status of the dove had not occurred in the State prior to this time.

Trapping and banding techniques

Standard techniques are used.

Studies in progress

Types--Call-count survey, road counts, kill statistics, habitat management, production, banding.
Personnel employed--One biologist is assigned practically full time to dove projects. An estimated 1.5 man-years are devoted to dove investigations and management.

Hunting-kill statistics

Bag checks are conducted by biologists to obtain data on hunting success (doves-per-man-hour hunted) and on age composition of the kill.

LOUISIANA

Dove-contact address

John D. Newsom, Chief, Fish and Game Division, Louisiana Wildlife
and Fisheries Commission, 400 Royal Street, New Orleans 16.

Game-bird versus song-bird controversy

There is no controversy over the game-bird status of the dove in Louisiana.

Trapping and banding techniques

Adults and immatures--Two permanent trapping stations are operated at Monroe and Alexandria, and a temporary station is active at Grand Terre Island during October and November. Bait traps are the funnel type, constructed of 1 by 2-inch mesh welded wire.

Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, banding, road counts, hunter bag checks, habitat improvement on managed hunting areas.

Personnel employed--No biologist is assigned full time to dove work. In the aggregate, approximately 1.5 man-years annually are devoted to dove projects.

Hunting-kill statistics

Hunter bag checks are used to indicate trends in hunting success.

MARYLAND

Dove-contact address

John R. Longwell, Game Biologist, Maryland Department of Research and Education, Box 1510, Annapolis.

Game-bird versus song-bird controversy

There is no controversy in Maryland.

Trapping and banding techniques

Adults and immatures--Two types of traps are used: (1) a 30 by 30-inch quail-type trap with 1/2-inch mesh hardware-cloth sides and 1-inch stretched-mesh seine netting for the top and (2) an "S"-shaped shore-bird trap made with two 12-foot pieces of 1/2-inch hardware cloth for sides (18 inches high) and seine netting for the top. Whole corn and scratch feed are used as bait.

Studies in progress

Types--Call-count survey, banding.

Personnel employed--An estimated 0.1 man-year is spent on dove projects annually.

Hunting-kill statistics

No estimates are made.

MISSISSIPPI

Dove-contact address

Henry Bobbs, Jr., Dove Study Leader, Mississippi Game and
Fish Commission, Onward.

Game-bird versus song-bird controversy

No controversy is known to exist in the State.

Trapping and banding techniques

Adults and immatures--Collapsible bait traps are constructed of 1 by 2-inch mesh welded wire. The top is 36 inches square with an opening cut in the center for the removal of trapped birds. A door of similar wire and hinged with hog rings covers the opening. The sides are 12 by 36 inches and are joined at the corners by hog rings, which allow this part of the trap to be folded for storage. Two funnels are constructed of hardware cloth and are placed at opposite sides of the trap at 3-inch square openings cut in the side panels. The top and funnels are attached to the sides with short pieces of wire to allow easy removal and storage.

Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, banding, hunter bag checks, habitat improvement on managed hunting areas.

Personnel employed--No biologist is assigned full time to dove investigations. In the aggregate, approximately 1 man-year annually is spent on dove projects.

Hunting-kill statistics

Hunter bag checks are made on selected areas.

MISSOURI

Dove-contact address

Howard M. Wight, Biologist, Missouri Conservation Commission,
411 College Avenue, Columbia.

Game-bird versus song-bird controversy

There has been little controversy regarding the game-bird status of the dove in Missouri.

Trapping and banding techniques

Adults and immatures--A two-cell trap with a falling door mechanism is used. Hen scratch is used for bait.
Nestlings--Birds are not banded before 7 days of age. No special technique is required to hold the band on the leg.

Studies in progress

Types--Call-count survey, banding, road counts, hunter bag checks. In addition, a graduate student under the Cooperative Wildlife Research Unit at the University of Missouri is studying sex and age composition of winter flocks in an area that has been intensively studied by trapping and banding during the summer.
Personnel employed--One biologist is assigned to doves and cottontail rabbits. With a summer assistant, approximately 1 man-year is devoted to dove investigations.

Hunting-kill statistics

A field bag check of hunters is used to obtain hunting-kill statistics. In 1958, the estimated kill of doves was 252,000.

NEVADA

Dove-contact address

Joseph C. Greenley, Chief of Game, Nevada Fish and Game Commission, Box 678, Reno.

Game-bird versus song-bird controversy

There has been no known movement to change the game-bird status of the dove.

Trapping and banding techniques

No banding program is in operation.

Studies in progress

Types--Call-count survey, hunting-kill statistics.
Personnel employed--About 0.1 man-year is spent on dove projects annually.

Hunting-kill statistics

Estimates of kill are obtained through a post-season mail survey of a 10 per cent sample of licensed hunters. The estimated hunting kill for 1958 was 90,000 doves.

NEW MEXICO

Dove-contact address

William S. Huey, Project Leader, New Mexico Department of Game and Fish, Box 4201, Santa Fe.

Game-bird versus song-bird controversy

There has been no concerted effort to change the game-bird status of the mourning dove.

Trapping and banding techniques

Adults and immatures--Bait traps are constructed of 1 by 2-inch mesh welded wire, 16 gauge. Sides are 3 feet in length and 1 foot high, with four funnel entrances. Milo and wheat are used as bait with good results.
Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, banding, hunting-kill statistics.
Personnel employed--No biologist is assigned full time to dove investigations. Approximately 0.5 man-year annually is spent on dove projects.

Hunting-kill statistics

A postal survey based on a sample of license stubs is used to collect dove-harvest estimates. Bias-elimination factors developed for waterfowl kill data are applied. The kill estimate for 1958 was 199,000 doves.

NORTH CAROLINA

Dove-contact address

T. Stuart Critcher, Federal Aid Coordinator, Game Division, North Carolina Wildlife Resources Commission, Box 2919, Raleigh.

Game-bird versus song-bird controversy

North Carolina has not been involved.

Trapping and banding techniques

Adults and immatures--Bait traps are constructed of chicken wire with funnel entrances. Scratch feed is used as bait.
Nestlings--Dalzoflex elastic tape is satisfactory in banding nestlings.

Studies in progress

Types--Call-count survey, banding, hunter bag checks.
Personnel employed--It is estimated that 0.2 man-year is spent on dove projects annually.

Hunting-kill statistics

No estimates of total kill are made. Bag checks are used to obtain data on hunting success.

OKLAHOMA

Dove-contact address

Buell Atkins, Supervisor, Game and Federal Aid, Oklahoma
Department of Wildlife Conservation, Oklahoma City 5.

Game-bird versus song-bird controversy

No controversy has occurred over the game-bird status of the dove.

Trapping and banding techniques

No special techniques are used.

Studies in progress

Types--Call-count survey, hunting-kill statistics.
Personnel employed--Approximately 0.1 man-year is devoted to dove work annually.

Hunting-kill statistics

License stubs are used as a basis for a survey of hunting kill. No estimate is available for 1958.

OREGON

Dove-contact address

Robert U. Mace, Chief, Upland Game, Oregon State Game Commission,
Box 4136, Portland 8.

Game-bird versus song-bird controversy

The controversy over the status of the dove has not become significant in Oregon. Occasional comments have been received, particularly from landowners who object to dove hunters, but no organized campaign has developed.

Trapping and banding techniques

Adults and immatures--Traps are the walk-in type with two funnels and are constructed of welded wire. Millet appears to be the best bait.

Nestlings--Adhesive tape is used to hold the band on the leg.

Studies in Progress

Types--Call-count survey, banding, hunter bag checks, kill statistics.

Personnel employed--No biologist is employed full time on dove studies. Approximately 0.5 man-year is devoted annually to dove projects.

Hunting-kill statistics

Estimates of hunting kill are obtained through a mail survey of a random sample of hunting-license holders. The estimated kill in 1958 was 158,000 doves.

PENNSYLVANIA

Dove-contact address

Dr. Ward M. Sharp, Leader, Pennsylvania Cooperative Wildlife
Research Unit, 206 Forestry Building, University Park.

Game-bird versus song-bird controversy

There has not been any recent movement to remove doves from the game-bird list.

Trapping and banding techniques

Graduate students at the Cooperative Wildlife Unit are active in trapping and banding doves.

Studies in progress

Types--Call-count survey, banding, estimates of hunting kill.
Personnel employed--Approximately 0.2 man-year annually is spent in dove investigations.

Hunting-kill statistics

Based on Game Protectors' estimates, the dove harvest in 1958 was 45,000.

RHODE ISLAND

Dove-contact address

Donald Blais, Wildlife Research Technician, Rhode Island
Division of Fish and Game, Veterans Memorial Building,
Providence 2.

Game-bird versus song-bird controversy

There is no controversy over the status of the dove as a game bird.

Trapping and banding technique

Adults and immatures--A clover-leaf trap is used.
Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, hunting-kill statistics.
Personnel employed--About 0.1 man-year is devoted to dove work annually.

Hunting-kill statistics

Based on a mail survey of hunters, approximately 200 doves were killed in 1958.

SOUTH CAROLINA

Dove-contact address

Frank P. Nelson, P-R Coordinator, South Carolina Wildlife
Resources Department, Box 360, Columbia.

Game-bird versus song-bird controversy

There is no organized pressure to place the dove on the song-bird list.

Trapping and banding techniques

Adults and immatures--Two-cell Potter traps are used, with scratch grain as bait. A cannon net has been used successfully on doves at sites baited for turkeys.

Nestlings--No new techniques are used in nestling banding.

Studies in progress

Types--Call-count survey, banding, managed hunting areas.

Personnel employed--There are no full-time employees on dove work. About 0.2 man-year is allotted to dove projects annually.

Hunting-kill statistics

No estimates are made of hunting kill.

TENNESSEE

Dove-contact address

James W. Hammond, Supervisor, Game Management Services,
Tennessee Game and Fish Commission, Cordell Hull Building,
Nashville.

Game-bird versus song-bird controversy

Tennessee has not been involved in any controversy over the status of the mourning dove.

Trapping and banding techniques

Standard trapping and banding techniques are used.

Studies in progress

Types--Call-count survey, banding, road counts, hunter bag checks, managed hunting areas.
Personnel employed--No biologist is assigned full time to dove studies. Ten biologists work an aggregate of 0.8 man-year annually on dove projects.

Hunting-kill statistics

Kill-per-hour statistics are gathered through field bag checks.

TEXAS

Dove-contact address

P. B. Uzzell, Assistant Director, Division of Wildlife Restoration, Texas Game and Fish Commission, Austin.

Game-bird versus song-bird controversy

There are no records to indicate that Texas has ever been involved in a controversy over the status of the mourning dove.

Trapping and banding techniques

Adults and immatures--Several types of traps are used: (1) cannon net, 100 by 60 feet, No. 277 nylon webbing, $1\frac{1}{4}$-inch square mesh; (2) mist net, 9 by 55 feet; (3) drop net, 50 by 50 feet, 1-inch square mesh; (4) Florida box-type bait trap; (5) clover-leaf bait trap; and (6) welded-wire bait trap, constructed of 1 by 2-inch mesh welded wire, 2 by 3 feet, and 10 inches high, with a door cut in the top, and with two funnel entrances. Baits are hegari and milo, with hegari being preferred by doves.
Nestlings--Scotch tape and folded tissue paper have been used to hold bands on very small nestlings. The effectiveness of the techniques has not been thoroughly evaluated.

Studies in progress

Types--Call-count survey, banding, hunting-kill surveys.
Personnel employed--No biologist is assigned full time to mourning dove investigations. Approximately 0.3 man-year annually is devoted to mourning-dove projects.

Hunting-kill statistics

Estimates of the mourning-dove harvest have been made for the Trans-Pecos region and for the lower Rio Grande Valley during the white-winged dove season. No survey of hunting kill is made on a State basis.

UTAH

Dove-contact address

Clifton M. Greenhalgh, Supervisor of Upland Game, Utah
Department of Fish and Game, 1596 West North Temple,
Salt Lake City 16.

Game-bird versus song-bird controversy

Three years ago there was some discussion of the status of the dove by the legislature. There is no organized campaign to remove the dove from the game bird list now.

Trapping and banding technique

Adults and immatures--A folding bait-trap is used.
Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, banding, hunting-kill statistics, age ratios in bagged birds.
Personnel employed--No biologist is assigned to dove studies on a full-time basis. About 0.3 man-year is allotted to doves annually.

Hunting-kill statistics

Based on a mail questionnaire to licensed hunters, 86,000 doves were harvested in 1958.

VIRGINIA

Dove-contact address

Howard L. Sheldon, District Game Biologist, Virginia
Commission of Game and Inland Fisheries, 1114 Farley Street,
Culpeper.

Game-bird versus song-bird controversy

There is no controversy in Virginia over the status of the dove.

Trapping and banding techniques

Adults and immatures--A maze trap, similar to the North Carolina field trap described by Quay, is used with shelled corn as bait.
Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--Approximately 0.1 man-year is allotted to dove work.

Hunting-kill statistics

No estimates are made.

WASHINGTON

Dove-contact address

J. Burton Lauckhart, Chief, Game Management Division,
Washington Department of Game, 600 North Capitol Way,
Olympia.

Game-bird versus song-bird controversy

In the past there was considerable agitation in the State to make the dove a song bird, but this pressure reached a peak four years ago and apparently has declined.

Trapping and banding techniques

No new techniques have been developed.

Studies in progress

Types--Call-count survey, banding, hunting-kill statistics.
Personnel employed--Approximately 0.2 man-year is devoted to dove projects annually.

Hunting-kill statistics

Kill statistics are obtained by a random hunter questionnaire. The estimate for 1958 was 251,000 doves harvested.

WEST VIRGINIA

Dove-contact address

Jack A. Donnelly, Biologist, West Virginia Conservation
Commission, Route 1, Box 125, Point Pleasant.

Game-bird versus song-bird controversy

A small minority is advocating a closed hunting season on doves. A bill was introduced in the legislature in 1959 to remove the mourning dove from the game-bird list. The bill died in committee.

Trapping and banding techniques

Adults and immatures--Bait traps of the clover-leaf type with confusion entrances are used.
Nestlings--No special techniques are used.

Studies in progress

Types--Call-count survey, road counts, banding.
Personnel employed--Approximately 0.2 man-year is spent on dove projects annually.

Hunting-kill statistics

No survey is conducted.

NON-HUNTING STATES

CONNECTICUT

Dove-contact address

James S. Bishop. Biologist, Connecticut Fish and Game
Department, State Office Building, Hartford.

Game-bird versus song-bird controversy

There have been discussions regarding the status of the dove at annual public hearings on fish and game regulations. Local bird-study groups and some sportsmen are in favor of keeping the dove on the song-bird list. It is expected that there will be continued discussions on this subject at annual public hearings.

Trapping and banding techniques

No trapping and banding is being done.

Studies in progress

Types--Call-count survey.
Personnel employed--Less than 0.1 man-year is devoted to dove work annually.

INDIANA

Dove-contact address

John M. Allen, Biologist, Indiana Department of Conservation,
Box 117, West Newton.

Game-bird versus song-bird controversy

A bill was introduced in the 1959 Legislature by a sportsmen's group to remove the dove from the song-bird list. The effort lacked background data on dove populations and the controversy was based on desires and opinions rather than biological knowledge. Opposition stemmed from bird clubs and legislator-farmers. The bill died in the Senate. The State is now conducting a statewide study of the dove to provide needed information on the status of the dove.

Trapping and banding techniques

No new techniques are reported.

Studies in progress

Types--Call-count survey, banding, random road counts, production on study areas, wintering flocks, mortality studies, sex determination.
Personnel employed--One biologist is employed full time on dove projects. Fifteen biologists conduct random road counts, and 20 cooperators band nestlings. Approximately 2 man-years annually are devoted to dove investigations.

IOWA

Dove-contact address

James G. Sieh, Biologist, Iowa Conservation Commission,
Biology Station, Spirit Lake.

Game-bird versus song-bird controversy

The Iowa Conservation Commission attempted to have legislation passed during the last General Assembly to change the status of the dove from a song bird to a game bird. This attempt failed. Opposition included bird clubs, individuals from the Humane Society, and several newspapers. There is now no campaign to change the status of the dove.

Trapping and banding techniques

No special techniques are employed.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--About 0.1 man-year is allotted to dove work annually.

MAINE

Dove-contact address

W. Russell DeGarmo, Chief, Game Division, Maine Department of
Inland Fisheries and Game, Augusta.

Game-bird versus song-bird controversy

There is practically no demand to establish the dove as a game species. As a result, no work has been done on dove investigations by the State.

MASSACHUSETTS

Dove-contact address

E. Michael Pollack, Chief Game Biologist, Massachusetts
Division of Fisheries and Game, Westboro.

Game-bird versus song-bird controversy

The State did not report any controversy over the status of the dove. No dove investigations were reported.

Studies in progress

The Cooperative Wildlife Research Unit is considering a study of the mourning dove.

MICHIGAN

Dove-contact address

Victor S. Janson, Biologist, Michigan Department of Conservation, Lansing 26.

Game-bird versus song-bird controversy

A year ago a member group of the Michigan United Conservation Clubs proposed a resolution to consider a hunting season on doves. This resolution was not passed at the MUCC annual convention.

Trapping and banding techniques

No new techniques are reported.

Studies in progress

Types--Call-count survey, banding, road counts.
Personnel employed--Approximately 0.2 man-year is allotted to dove work annually.

MINNESOTA

Dove-contact address

Arnold B. Erickson, Game Research Supervisor, Minnesota Department of Conservation, 658 Cedar Street, St. Paul 1.

Game-bird versus song-bird controversy

There was a controversy over the status of the dove in 1944 and 1945. The last open hunting season was in 1945. Various bird clubs were chiefly responsible for placing the dove on the song-bird list. There is no campaign now to change the status of the dove.

Trapping and banding techniques

Adults and immatures--Nest traps, mist nets, and bait traps are used.
Nestlings--Dalzoflex tape is used in nestling banding.

Studies in Progress

Types--Call-count survey, banding, migrational-homing study.
Personnel employed--About 0.5 man-year is devoted to dove investigations annually.

MONTANA

Dove-contact address

Robert L. Eng, Small Game Research Supervisor, Montana Department of Fish and Game, Helena.

Game-bird versus song-bird controversy

A dove-hunting season was established in 1949. Shortly thereafter, the dove was returned to song-bird status. Objections to hunting doves seem to come from agricultural representatives. The Montana Wildlife Federation unsuccessfully supported a bill during the last legislature to consider the dove as a game bird.

Trapping and banding techniques

No activity is reported.

Studies in progress

Types--Call-count survey.
Personnel employed--Approximately 0.1 man-year annually is spent on dove projects.

NEBRASKA

Dove-contact address

Bill Bailey, Project Leader, Game Division, Nebraska Game, Forestation and Parks Commission, State House, Lincoln 9.

Game-bird versus song-bird controversy

The mourning dove was removed from the game-bird list and was given the status of a song bird by the legislature in 1953. Legislation has been introduced each legislative session since 1953 to restore the dove to game-bird status. The last effort was made in 1959, but the bill was defeated. Legislation will be introduced again in 1961.

Opposition to hunting doves is expressed by farmers' groups, garden clubs, and utility companies. The Nebraska Ornithologists' Union did not oppose legislation to reclassify the dove as a game bird. Many of the arguments presented by the opponents of dove hunting have been in the realm of opposition to hunting in general rather than to dove hunting specifically. The most frequent comments concern anticipated damage to private property by hunters if dove hunting were permitted and the "backyard" habits of the dove.

Trapping and banding techniques

Standard techniques are used.

Studies in progress

Types--Call-count survey, banding, nesting studies, food habits.
Personnel employed--Approximately 0.5 man-year is allotted to dove investigations annually.

NEW JERSEY

Dove-contact address

L. G. MacNamara, Chief, Bureau of Wildlife Management, New Jersey Department of Conservation and Economic Development, 230 West State Street, Trenton.

Game-bird versus song-bird controversy

There is a great deal of interest in the dove in New Jersey. Objections to hunting doves are offered mainly by various bird clubs, garden clubs, and nature clubs. The State Federation of Sportsmen's Clubs is endeavoring to change the status of the dove from a song bird to a game bird.

Trapping and banding techniques

Standard techniques are used.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--An estimated 0.1 man-year is spent on dove projects annually.

NEW HAMPSHIRE

Dove-contact address

Harold C. Lacaillade, Jr., Biologist, New Hampshire Fish and
Game Department, 34 Bridge Street, Concord.

Game-bird versus song-bird controversy

There is no controversy over the status of the dove.

No studies are being conducted.

NEW YORK

Dove-contact address

Walton B. Sabin, Conservation Biologist, New York Conservation
Department, State Campus Site, Albany 1.

Game-bird versus song-bird controversy

New York has not been involved in any major controversy over the status of the dove. Sportsmen in the Lower Hudson Valley and on Long Island have expressed interest in a hunting season.

Trapping and banding techniques

No activities are reported.

Studies in progress

Types--Call-count survey.
Personnel employed--Time devoted to dove studies is estimated to be 0.1 man-year annually.

NORTH DAKOTA

Dove-contact address

Charles H. Schroeder, Waterfowl Biologist, North Dakota Game and Fish Department, Fort Lincoln, Bismarck.

Game-bird versus song-bird controversy

There has been very little demand from the public for a hunting season on doves.

Trapping and banding techniques

Nestlings--Dalzoflex tape is used and has been satisfactory.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--Approximately 0.1 man-year annually is devoted to dove projects.

OHIO

Dove-contact address

Delmar Handley, Biologist, Ohio Division of Wildlife, Route 1, Ashley.

Game-bird versus song-bird controversy

The dove was changed from game-bird to song-bird status in 1917. Much of the opposition to shooting doves was from local bird clubs, garden clubs, and other groups of this type. Companies owning power lines also opposed dove hunting. During recent years, a number of sportsmen's clubs have recommended to the Ohio Division of Wildlife that an open hunting season be permitted on doves. The State is gathering information on the population status of the dove in Ohio.

Trapping and banding techniques

Adults and immatures--The most successful trap is one constructed of 14 gauge, 1-inch mesh, welded wire. It is approximately 5 feet long, 3 feet wide, and 1 foot high. There is a single funnel entrance about 4 inches wide at the outside opening. A bottom is attached to the trap to

discourage predation and to facilitate transportation. The trap is assembled with hog rings. Doves are removed from the trap through a small door located in the top section.
Nestlings--Efforts to "scotch tape" bands to legs of very small nestlings have been unsuccessful, generally. At present, nestlings are banded when they are 7 to 12 days of age and large enough to retain the bands.

Studies in progress

Types--Call-count survey, road counts, banding.
Personnel employed--No biologist is assigned full time to dove projects. In the aggregate, about 1.5 man-years are devoted to dove investigations annually.

SOUTH DAKOTA

Dove-contact address

Lloyd E. Oldenburg, District Game Manager, South Dakota
Department of Game, Fish and Parks, Court House Annex,
Sioux Falls.

Game-bird versus song-bird controversy

The Department sponsored a bill to place doves on the game-bird list during the 1959 session of the legislature. The measure passed the House but was defeated in the Senate. The opposition came from bird clubs. Organized sportsmen's groups were contacted by the Department and were found to be unanimously in favor of game-bird status for the dove. The opposition defeated the bill because the bird clubs contacted their congressmen while sportsmen's groups did not actively push the issue.

Trapping and banding techniques

Standard techniques are used.

Studies in progress

Types--Call-count survey, banding, nesting studies.
Personnel employed--Approximately 0.3 man-year is allotted to dove work annually.

VERMONT

Dove-contact address

George W. Davis, Director, Vermont Fish and Game Service, Montpelier.

Vermont reported no studies on doves.

WISCONSIN

Dove-contact address

James B. Hale, Chief of Wildlife Research, Wisconsin Conservation Department, Nevin State Hatchery, Route 3, Madison 5.

Game-bird versus song-bird controversy

The mourning dove is listed as a game bird in Wisconsin. A hunting season on the species has not been held, however. From time to time, interest has been shown by sportsmen's groups in considering a dove-hunting season. Opposition from bird clubs and similar organizations has offset the interest in hunting doves. At the present time, increasing interest is being shown by sportsmen's groups in establishing a limited open season.

Trapping and banding techniques

Standard techniques are used.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--Approximately 0.1 man-year annually is allotted to dove projects.

WYOMING

Dove-contact address

George F. Wrakestraw, Biologist, Wyoming Game and Fish Commission, Box 567, Torrington.

Game-bird versus song-bird controversy

Wyoming opened the hunting season on doves in 1956. The legislature placed the species on the song-bird list in 1957. Opposition to shooting the doves came from a number of groups--farmers, flower clubs, ladies clubs, etc. No effort is being made now to change the status of the dove in the State.

Trapping and banding techniques

Nestlings--Adhesive tape was used to hold bands on nestlings. Better techniques should be developed.

Studies in progress

Types--Call-count survey, banding.
Personnel employed--About 0.1 man-year annually is devoted to dove work.

Table 1. A Summary of Activities by States in Mourning Dove Management and Research

HUNTING STATES

States	Game-bird versus Song-bird Controversy		Studies in Progress*	Annual Man-years on Dove Projects[1]	Estimated Hunting Kill-1958**
	Past	Present			
Ala.	No	No	B C K R	2.8	--
Ariz.	No	No	A B C D K P	1.5	867,000
Ark.	No	No	B C	(0.1)	--
Calif.	Yes	Yes	B C D F H K P	3.0	1,700,000
Colo.	No	No	B C K	(0.1)	152,000
Del.	No	No	B C	(0.1)	--
Fla.	No	No	B C K	(1.0)	--
Ga.	No	No	B C	(0.1)	--
Idaho	Yes	Yes	B C K P R	(0.8)	144,000
Ill.	Yes	Yes	B C K	0.3	1,338,000
Kans.	Yes	Yes	B C K	0.2	1,197,000
Ky.	No	Yes	B C H K P R	(1.5)	--
La.	No	No	B C H K R	(1.5)	--
Md.	No	No	B C	(0.1)	--
Miss.	No	No	B C H K	1.0	--
Mo.	No	No	B C K R W	1.0	252,000
Nev.	No	No	C K	(0.1)	90,000
N. Mex.	No	No	B C K	(0.5)	199,000
N. C.	No	No	B C K	(0.2)	--
Okla.	No	No	C K	(0.1)	--
Oreg.	No	No	B C K	0.5	158,000
Pa.	No	No	B C K	(0.2)	45,000
R. I.	No	No	C K	(0.1)	200
S. C.	No	No	B C H	(0.2)	--
Tenn.	No	No	B C H K R	0.8	--
Texas	No	No	B C K	(0.3)	--
Utah	Yes	No	A B C K	(0.3)	86,000
Va.	No	No	B C	(0.1)	--
Wash.	Yes	No	B C K	(0.2)	251,000
W. Va.	Yes	Yes	B C R	(0.2)	--
Hunting States Total	7 Yes	6 Yes		Total 18.9 Average 0.6	

Table 1. A Summary of Activities by States in Mourning Dove Management and Research (Cont'd)

NONHUNTING STATES

States	Game-bird versus Song-bird Controversy		Studies in Progress*	Annual Man-years on Dove Projects[1]	Estimated Hunting Kill-1958**
	Past	Present			
Conn.	Yes	Yes	C	<0.1	
Ind.	Yes	Yes	B C P R W	2.0	
Iowa	Yes	Yes	B C	(0.1)	
Maine	No	No	None	None	
Mass.	No	No	None	None	
Mich.	Yes	Yes	B C R	(0.2)	
Minn.	Yes	No	B C W	(0.5)	
Mont.	Yes	Yes	C	(0.1)	
Nebr.	Yes	Yes	B C F P	(0.5)	
N. J.	Yes	Yes	B C	(0.1)	
N. H.	No	No	None	None	
N. Y.	No	No	C	(0.1)	
N. Dak.	No	No	B C	(0.1)	
Ohio	Yes	Yes	B C R	1.5	
S. Dak.	Yes	Yes	B C P	0.3	
Vt.	No	No	None	None	
Wis.	Yes	Yes	B C	(0.1)	
Wyo.	Yes	No	B C	(0.1)	
Nonhunting States Total	12 Yes	10 Yes		Total 5.7 Average 0.3	
National Total	19 Yes	16 Yes		Total 24.6 State Average 0.5	

* A - Age ratios in bagged birds
B - Banding
C - Call-count survey
D - Diseases
F - Food habits
H - Habitat improvement, including managed hunting areas
K - Hunting-kill surveys, including bag checks
P - Production and/or nesting studies
R - Road counts
W - Wintering flocks and/or homing studies

** Dash indicates no information on total hunting kill was reported for 1958.

1/ Numbers in parenthesis were estimated by the compiler on the basis of information provided by the State.

ACTIVITIES OF THE BUREAU IN MOURNING DOVE MANAGEMENT AND RESEARCH

Management of the mourning dove is a responsibility vested in the Bureau of Sport Fisheries and Wildlife under migratory-bird treaties with Canada and Mexico. The primary responsibility of the Bureau is conservation of the mourning dove population. A related goal is to maintain a population that is large enough to sustain an annual harvest by hunting and also to provide opportunities for observation, study, and enjoyment of doves by nonhunters.

A sound management program must be based on facts and principles discovered through research. Management of mourning doves currently consists almost entirely of hunting regulations. Habitat management has received little attention. Habitat conditions appear to be favorable for the mourning dove in most parts of the United States. The species is expanding its range in northeastern United States and in Canada and generally is in a period of population increase. If the population begins to decline markedly, more attention probably will be given to habitat management.

Knowledge of the effect of hunting and hunting regulations on the dove population is of primary importance both in conserving the birds and in liberalizing regulations. The Bureau's research projects are described briefly below, and additional research needs are discussed.

RESEARCH PROJECTS

1. Reorganization and evaluation of the call-count survey of the breeding population

Justification--The call-count survey is the only currently-available index to the dove population. It has been the principal basis for formulating hunting regulations, since it shows trends in the national dove population. Call-count statistics also have been used to weight banding data for analysis.

It is necessary to reorganize the call-count survey on a statistically sound basis because results are being used not only for detecting major trends in the population but also for determining population levels in States or management-units.

Evaluation of the call-count technique is needed to interpret the results, which are expressed as doves-heard-calling per route. It is necessary to know more reliably what a calling dove represents in terms of actual breeding birds and dove production. If the call-count index represents a different fraction of the actual population in different habitats, different areas cannot be compared without understanding the differences.

Progress--Leonard E. Foote, working with the Wildlife Management Institute, under contract with the Bureau, has completed a report outlining a sampling design for call-count routes. This design prescribes random selection of call-count routes within strata that are distinct in dove-density and distribution patterns. Strata generally follow physiographic types. Procedures for randomly selecting the new routes are outlined in detail in the report.

There has been little or no progress in evaluating the call-count technique since it was first suggested by the research of McClure[1] in 1939 and adopted as a census technique after some field investigations[2] in 1950 and 1951. Studies by McGowan[2], Kerley[2], and Lowe[3] showed highly variable relationships between numbers of calling doves and the size of the breeding population.

Needs--After the new call-count routes are selected and in operation, the system should be re-appraised on the basis of the new data.

Some of the factors that need to be understood in order to interpret call-count data in terms of dove populations and production are: (1) the relationship of roadside and non-roadside populations, (2) the influence of habitat and other factors on the distance dove calls can be heard, (3) the variation between broad regions of the country in the time of the peak or plateau of dove-calling activity, (4) the relationship between dove density and calling frequency, and (5) the production differences between habitat types.

1/ McClure, H. E. 1939. Cooing activity and censusing of the mourning dove. Jour. Wildlife Mgt., 3: 323-328.

2/ Foote, L. W., H. S. Peters, T. H. McGowan, C. Kerley, A. J. Duvall, C. S. Robbins, and F. H. Wagner. 1952. Reports in Investigations of methods of appraising the abundance of mourning doves. U. S. Fish and Wildlife Service, Special Scientific Report--Wildlife No. 17, 53 pp.

3/ Lowe, J. I. 1956. Breeding density and productivity of mourning doves on a county-wide basis in Georgia. Jour. Wildlife Mgt., 20 (4): 428-433.

2. Banding program: planning and analysis

Justification--Banding recoveries will make it possible to attempt to establish a relationship between production and harvest areas and also will provide data for studies of mortality. If production and harvest areas can be related, they then can be considered as units and managed accordingly.

Progress--Goals of a 5-year nestling-banding program probably will be attained in 1960 through the cooperation of State, Federal, and private banders. An analysis of bandings for the 1953 to 1957 period resulted in a progress report[4] outlining three tentative management units.

A study of mortality through analysis of banding data was postponed by a fire that damaged IBM records in the Bird-Banding Office. The Bureau is now reconstructing these banding records. A primary aim of the study of dove mortality is to assess the importance of hunting as a factor in annual mortality.

Band loss by nestling doves is being investigated on a study area in Mississippi this summer (1960). Band sizes 3 and 3A and Dalzoflex tape are being tested on nestlings of various ages.

Needs--Continued banding is necessary for mortality studies, both in general and in specific population segments. Emphasis in the banding program probably will shift from nestlings to immatures and adults, which will be banded in late summer, fall and winter. It is possible that banding of distinct populations before and after the hunting season will permit an evaluation of the proportion of annual mortality that occurs during the hunting season.

The banding program will be planned in more detail after the fire-damaged IBM records are replaced and banding analysis can be resumed. A study of band-reporting rates also should be undertaken as an aid to interpretation of banding data.

3. Investigation of methods of estimating hunting kill

Justification--There is no national survey of hunting kill of doves. Hunting regulations are the major management tool, but there is no good measure of the effect of changes in regulations. A reliable estimate of the dove kill will show the importance of the dove as a game species.

4/ Kiel, W. H., Jr. 1959. Mourning dove management units--a progress report. U. S. Fish and Wildlife Service, Special Scientific Report--Wildlife No. 42, 24 pp.

Progress--A study of methods of estimating the hunting kill of doves has been completed by the Institute of Statistics, North Carolina State College, under contract to the Wildlife Management Institute, the Bureau, and the Welder Wildlife Foundation. If there were dove stamps or State universal (or master) hunting licenses, sampling systems could be based on them. The Institute of Statistics has recommended pilot studies to evaluate a system based on State licenses or telephones and supplemented by field sampling of dove hunters. The field sampling would provide such estimates as hunting success for licensed and nonlicensed hunters, and for telephone owners and non-owners. Each of these systems has difficulties and problems, but it is important to make real efforts to develop a workable sampling plan.

4. Productivity studies

Techniques for distinguishing between adults and immatures, after the doves have completed the primary covert molt, are being investigated on a small scale at Patuxent. It is possible that large-scale collection of wings by mail would yield valuable productivity data if reliable age criteria could be found.

5. Disease studies

Dr. L. N. Locke of the Wildlife Disease Section at Patuxent is studying trichomoniasis, pox, and other diseases in mourning doves. The purpose of these studies is to determine (1) the incidence of the disease in the population, (2) factors responsible for development of fatal infections, and (3) mode of transmission of the disease.

MANAGEMENT PROJECTS

The principal mourning dove management projects of the Bureau are the call-count survey and banding. A major portion of the Bureau's activity in these projects is under the Branch of Management and Enforcement. Game management agents frequently coordinate cooperative nestling-banding projects in a State in addition to coordinating the call-count survey.

MAN-YEARS DEVOTED ANNUALLY TO MOURNING DOVE PROJECTS

Estimates of man-years are rough approximations, which tend to be minimal.

Projects	Branch of the Bureau	Man-years Annually
Call-count survey	Management & Enforcement	0.5
Banding	Management & Enforcement	4.0
Call-count survey, banding	Refuges and others	0.5
Dove research (two biologists)	Research	2.0
Total		7.0

ACTIVITIES OF COOPERATIVE WILDLIFE RESEARCH UNITS

Studies on mourning doves are underway or being planned at the Cooperative Wildlife Research Units of Arizona, Missouri, Massachusetts, Pennsylvania, and Utah. There are active projects on the following subjects: Arizona--nesting chronology and habitat evaluation; Missouri--sex and age composition of wintering flocks; and Utah--productivity, migrational patterns, and habitat preference in Idaho. Projects at the Massachusetts and Pennsylvania Units are inactive or in the planning stage.

PLANNING A NATIONAL PROGRAM OF MOURNING DOVE RESEARCH AND MANAGEMENT

The Dove Committee of the International Association of Game, Fish and Conservation Commissioners presented a report in September 1959 that emphasized the importance of the mourning dove as a game bird and recommended an expanded research and management program on a national scale. A Dove Technical Committee was appointed for the purpose of outlining research and management needs for a national program of dove management.

The Dove Technical Committee presented its recommended program to the International Association's Dove Committee and to the Bureau of Sport Fisheries and Wildlife at the 25th North American Wildlife Conference, Dallas, Texas, March 1960. The Bureau's comments and suggestions will be presented to the International Association at its meeting in September 1960 when all recommendations for a national program of dove research and management will be considered.

AN OUTLINE OF DISEASES OF THE MOURNING DOVE*

Although the mourning dove has been a major migratory game bird for decades, comparatively little work has been done on the various causes of dove mortality. Prior to the 1950 outbreak of trichomoniasis among mourning doves in Alabama, disease had been considered of little or no importance among doves. This report briefly describes several of the diseases of mourning doves in continental United States and suggests diagnostic procedures that may aid field biologists in determining the causes of dove mortality.

TRICHOMONIASIS

This disease is caused by a flagellate protozoan, *Trichomonas gallinae*. The protozoan lives in the upper digestive tract, particularly in the mouth and crop of pigeons, doves, and chickens.

Trichomoniasis in doves usually is seen as a variable-sized, yellow, cheesy mass in the posterior part of the mouth. Occasionally the cheesy mass, or "canker", is located in the crop. The canker may enlarge until it blocks the passage of food and/or air and the dove dies of starvation and/or asphyxiation.

Hawks and falcons can become infected by feeding on diseased doves and pigeons. These birds commonly show liver abscesses.

Natural outbreaks have occurred in Java sparrows, band-tailed pigeons, ring doves, and sea gulls. We have found *Trichomonas gallinae* in white-winged and Inca doves in Texas. English sparrows, cardinals, barn swallows, goldfinches, and song sparrows have been infected experimentally. Trichomoniasis has been reported from chickens and turkeys in the United States. Domestic pigeons are commonly infected.

Diagnosis: 1. Wet smears made of saliva from infected birds contain large numbers of trichomonads.

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* Contributed by Louis N. Locke, D.V.M., Patuxent Wildlife Research Center, Laurel, Maryland

2. Trichomonads can be isolated by the culture-swab technique. A tube of Diamond's trichomonad medium is inoculated with material obtained from the mouth of the dove. The saliva can be removed with either a forceps or a collodion-treated cotton swab (avoid using an untreated cotton swab because the flagellates tend to become trapped in the cotton fibers). The tube then can be mailed or carried to a laboratory, incubated at 37° C and examined after 24 hours' incubation. Trichomonads will survive in Diamond's medium for several days at room temperature. Swabs obtained on September 13 contained living trichomonads when received at the laboratory on September 18, after five days in the mail.

3. Animal inoculation tests should be carried out to determine if the isolate is pathogenic.

POX

This is a disease produced by a virus. The condition is similar to pox disease found in chickens, turkeys, pigeons, and song birds. It is not yet known whether the mourning dove pox is identical with the strains that attack pigeons.

Pox is seen most often as nodules upon the head, base of the bill, and/or around the eye. Nodules also may develop upon the feet and wings of infected doves. These start as small raised areas and develop into roughly spherical nodules ranging from the size of a pea to that of a small bird egg. The nodule is a solid growth, not a cyst containing fluid. It is formed by the rapid growth of the infected skin cells.

Pox virus is transmitted from one bird to another through tiny abrasions upon the skin of the susceptible dove. The virus also can be transmitted by various biting insects, such as mosquitoes and gnats.

Diagnosis: 1. A tentative diagnosis of cutaneous pox can be made by finding the characteristic skin nodules.

2. The oral forms or diphtheritic forms of pox, which also have been called "canker" by laymen, can be distinguished from trichomoniasis only by laboratory examination.

3. Presumptive diagnosis of pox can be made by demonstration of the typical inclusion bodies of avian pox. These inclusion bodies are eosinophilic, spherical to ovoid in shape, cytoplasmic, and range from 5 u to 40 u in diameter. Thus they can be identified only microscopically.

a. Impression smears can be stained with Wright's stain.

b. For histological examination, tissues should be fixed in 10% formalin, Bouin's fixative, or in Zenker's fixative. After fixing and mounting in paraffin, the slides are stained with hematoxylin and eosin.

4. Definitive diagnosis requires isolation of the pox virus. Isolation is done by inoculation of the chorio-allantoic membrane of embryonated eggs.

The pox virus is extremely resistant to drying. Nodules cut from a bird will retain their infectivity at room temperature for several months. Such nodules could be removed and shipped in a dry glass container to a diagnostic laboratory for virus isolation.

COCCIDIOSIS

Coccidiosis is a protozoan disease involving the mucosa of the intestine. Although coccidiosis has not yet been found to be an important mourning dove disease in the southeast, Rosen (Outdoor California, January 1959) states it takes a small toll of doves around desert water holes in California.

Diagnosis: 1. A direct fecal smear (simply smearing out a dab of feces in saline, placing a coverslip over the slide and examining it microscopically) is a relatively poor method for determining parasitic infection. However, it often will reveal severe coccidial infections. Concentration techniques, utilizing zinc sulfate, concentrated sugar, or bichromate solutions will concentrate coccidial oocysts and aid in the detection of less severe coccidial infections.

2. Diagnosis can be made of histologic examination. Intestinal tissues are fixed in 10% formalin (10 times as much formalin as specimen), then sectioned and stained with hematoxylin and eosin.

3. Field biologists suspecting a coccidial outbreak could preserve feces in a moist bag in a refrigerator (4° C) or fix tissues in formalin for later examination.

BLOOD PROTOZOAN INFECTIONS

Members of three protozoan genera have been reported frequently as parasites in mourning dove blood: *Haemoproteus*, *Leucocytozoon*, *Plasmodium*. In a 4-year survey in Illinois, Levine, et al. (Proc. Soc. Protozool., Vol. 3(2), 1952) found that 66% of 206 wild mourning doves were infected. *Haemoproteus sacharvoi* was found in 50%; *H. maccallumi* in 25%; and *Leucocytozoon* sp. in 0.5%. *Haemoproteus* infections in doves also have been found in Maryland, Texas, California, Nebraska and other states. Unfortunately no studies have been conducted to determine if these infections can produce losses. Rosen (Outdoor California, January 1959) cites the occurrence of an outbreak of "bird malaria" near Williams, California: "An unseasonably high number of mosquitoes coincided with the large numbers of doves. Bird malaria broke out, wiping out 50 doves. Then storms swept away the mosquitoes, dispersed the doves and the outbreak ended."

Diagnosis: Blood films are made by smearing a drop of blood across the slide using the edge of a second glass slide as spreader. Slides are allowed to dry, then stained with Wright's stain.

Blood films can be made in the field, allowed to dry, then forwarded to a laboratory for staining and examination. The technique is simple when known. One demonstration usually suffices to teach a novice to make acceptable preparations.

SALMONELLOSIS

Several species of the bacterial genus *Salmonella* and the closely related genus *Paracolon* have been isolated from pigeons and doves. In pigeons, *Salmonella* is the cause of the disease "boils". The lesion appears as a spherical, soft, pussy mass which indents when touched. It most frequently is found near the wing and/or leg joints. Pox nodules are firm, solid growths which do not indent. To date "boils" have not yet been reported in doves, although Dr. Rokey in Arizona has isolated a strain of Salmonella from white-winged doves and Mr. Hughes Simms, University of Georgia, has found a Paracolon in mourning doves.

It is possible that these bacteria may be responsible for losses of nestlings.

Diagnosis: Bacteria can be isolated on the specialized media used for isolation of Salmonellae. Study and diagnosis requires laboratory facilities and specialized procedures.

VIRAL DISEASES

Very little has been done on viral disease, other than pox. Studies are beginning at the University of Georgia to determine if the dove can become infected with the common poultry viruses--Newcastle, infectious bronchitis, etc.

Diagnosis: Serum should be obtained by cardiac puncture and submitted to a diagnostic laboratory for the running of routine tests used on commercial poultry flocks.

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